Construction News

★Denotes work advertised in ENGINEERING NEWS.
✚Denotes contract awarded. The names of bidders awarded contracts are set in CAPITALS.

RAILWAYS

Alabama—Tennessee & Alabama R. R.—See item under Tennessee.

Tennessee—Tennessee & Alabama R.R.—Surveys are being made by this company for the construction of its proposed railway from Fayetteville, Tenn., to Huntsville, Ala., about 34 miles. J. E. Hurd, Fayetteville, Tenn., is Ch. Engr.

✚**Kentucky**—Louisville & Nashville R.R.—According to press reports this company has awarded a contract to LANGHORNE & LANGHORNE, Richmond, Va., for constructing a five-mile branch from Typo, Ky., to the property of the Haley Coal Co.

Edwin W. Gearhart and J. A. Helm, Scranton, Penn., who recently purchased coal and timber lands in Clay County, Ky., plan the construction of a railway from Barbourville to Manchester, Ky.

Ohio—Pennsylvania Lines West of Pittsburgh—This company, it is reported, bought the Dayton, Lebanon & Cincinnati R.R., which runs between Dayton, Ohio, and Lebanon, Ohio, for $1,000,000.

Missouri—Rolla, Ozark & Southern Ry.—This company has secured the right-of-way and is making preliminary arrangements to construct its proposed railway from Rollo to Anutt, Mo., about 18 miles. J. E. Walker, Rollo, Mo., is Secy. and Gen. Mgr. Noted July 2.

Arkansas—Cairo-Truman & Southern Ry.—This company contemplates the construction of a 20-mile extension to its line from its present terminus to Earl, Ark. L. M. Preston, St. Louis, Mo., is Gen. Mgr.

Washington—The Farmers' Union Grain Agency contemplates the organization of a company for the construction of a 20-mile railway in Washington. R. O. Earnheart, Wallula, Wash., is interested.

California—Southern Pacific Co.—According to press reports plans are being considered by this company for the extension of its Mojave and Bakersfield branch from Cameron to Mojave, Calif., and from Tehachapi to Treves. W. Hood, San Francisco, Calif., is Ch. Engr.

Stockton, Terminal & Eastern R.R.—Plans are being prepared by this company for the extension of its line from Bellota to Jenny Lind, Calif., about ten miles. J. E. Adams, Stockton, Calif., is Vice-Pres. and Gen. Mgr.

Northwestern Pacific R.R.—Surveys are being made by this company for the construction of a branch line from Healdsburg to Christine, Calif., about 61 miles. J. W. Williams, San Francisco, Calif., is Ch. Engr. Const.

ELECTRIC RAILWAYS

New Haven, Conn.—The Connecticut Co. is considering plans for the extension of its lines on East St. from Water to State St. F. P. Harlan, New Haven, is Mgr.

Willimantic, Conn.—The Willimantic & Manchester St. Ry. Co. has been incorporated to construct an electric railway to connect Willimantic, Hop River, Andover, Bolton and Manchester, about 18 miles. T. J. Spellacy, Hartford, Conn., is interested.

Ilion, N. Y.—The Business Men's Association is agitating the construction of an electric railway in Ilion.

Monticello, N. Y.—The Monticello & Middletown Ry. Co. is being organized to construct an electric railway from Monticello to Middletown. Blake A. Mapledoram, Monticello, is interested.

Saratoga Springs, N. Y.—The Hudson Valley Ry. Co. contemplates constructing the connection of its Troy-Saratoga and Saratoga-Warrensburg lines in Saratoga Springs. A. E. Reynolds, Glens Falls, is Gen. Mgr.

✚**Point Pleasant, N. J.**—The Trenton, Lakewood & Seacoast Ry. Co. has awarded the contract for the construction of an electric railway from Trenton to Point Pleasant, about 30 miles, to the VANDERGRIFT ENGINEERING CO.

Marietta, Penn.—The citizens of Marietta and Maytown contemplate the construction of an electric railway to connect the two towns.

Washington, D. C.—Preliminary arrangements are being made by the Washington Ry. & Electric Co. for double-tracking its line on 14th St. from F St. to Pennsylvania Ave., and on Water St. from 14th St. eastward. R. W. Crowell, Washington, is Pur. Agt.

Safety Harbor, Fla.—According to press reports, plans are being prepared for the construction of an electric railway at Safety Harbor.

Birmingham, Ala.—The Birmingham Ry., Light & Power Co. is preparing to construct about two miles of new track in Birmingham. J. P. H. de Windt, Birmingham, is Gen. Mgr.

Newport, Tenn.—The Carolina, Greenville & Northern R.R. Co. has been incorporated to construct an electric railway from Kingsport to Newport. H. S. Reed, Los Angeles, Calif., is Pres., and James L. Callahan and Kirby Thomas, New York, N. Y., are Vice-Presidents.

Alliance, Ohio—The Stark Electric Ry. Co. plans to extend its line from Alliance to Marlborough, about seven miles. F. L. Mowry, Alliance, is Gen. Mgr. and Pur. Agt.

Chillicothe, Ohio—According to press reports, a company is being organized to construct an electric railway from Chillicothe, Ohio, to Peoria, Ill. E. F. Hunter, E. A. Mitchell, E. V. Mattice and John F. Lynch are interested.

Columbus, Ohio—The citizens have petitioned the Columbus Ry., Power & Light Co. to construct a line to connect its 11th and Chittenden Ave. lines. E. K. Stewart, Columbus, is Vice-Pres. and Gen. Mgr.

Ironton, Ohio—The Portsmouth St. Ry. & Light Co. is preparing plans for the construction of an electric railway from Ironton to Sciotoville, about 22 miles. R. D. York, Portsmouth, is Vice-Pres. and Gen. Mgr.

Dixon, Ill.—Plans are being prepared by the Sterling, Dixon & Eastern Electric Ry. Co. for the extension of its lines in Dixon. A. W. Cournyer, Dixon, is Supt.

Peoria, Ill.—See item under Chillicothe, Ohio.

Phœnix, Ariz.—Plans are being considered by the Phœnix Ry. Co. for the construction of a 1½-mile extension to its line on South First Ave. Samuel H. Mitchell, Phœnix, is Gen. Mgr. and Pur. Agt.

Pasadena, Calif.—The City Council has granted a franchise to the Pacific Electric Ry. Co. to construct a double-track line on North Lake Ave., in Pasadena. J. McMillan, Los Angeles, is Gen. Mgr.

Ukiah, Calif.—Preliminary arrangements are being made for the construction of the proposed electric railway to connect Ukiah, Cold Creek, Upperlake and Potter Valley. E. L. Cunningham, P. Connolly and T. J. Weldon are interested. Noted Dec. 10.

LIGHT, HEAT AND POWER

Pawtucket, R. I.—It is reported that bids will soon be asked for plumbing and heating apparatus in the new Abbott St. and Newport Ave. Schools. R. C. Monahan is Arch.

✚**Hartford, Conn.**—The P. J. Carlin Construction Co., general contractors for the reconstruction of the station of the New York, New Haven & Hartford R.R., has awarded a subcontract for heating and ventilating equipment to the MILNER-BILL CO., Springfield, Mass.

Albany, N. Y.—The United Traction Co. will spend about $55,000 for machinery and for copper and underground cable for its new transformer station to be built at Sheridan Ave. and Chapel St. James F. Hamilton, Albany, is Gen. Mgr. of the company.

Newton, N. J.—The Board of Public Utility Commissioners has authorized the Newton Gas & Electric Co. to make some improvements in its gas and steam plants. George P. Mathews, Newton, is Secy. of the Newton Gas & Electric Co.

Kutztown, Penn.—The Borough Council has decided to build a new municipal electric plant, costing about $23,000, to supply electricity for municipal and commercial purposes. Bonds for the construction of a new plant were voted last November. The present plant will be used until the new one is completed. F. A. Moyer is Chn. of the Electric Light Com. Noted Nov. 19.

Laurelton, Penn.—It is reported that the Borough Council is considering the construction of a power house to cost about $6000.

Monaca, Penn.—The City Council, according to press reports, is considering the establishment of a municipal electric-light plant, in which case, it will purchase the distributing systems of the Monaca Electrc Co. and the Beaver County Light Co., which now supply electricity to the town.

✚**Bay Minette, Ala.**—The City Council has awarded the contract for the construction of a municipal electric-light plant to J. W. GURLEY, Mobile, Ala., at approximately $32,500. The plant will include a three-phase 60-cycle 2300-volt generator, a two-panel switchboard exciter and about two miles of pole line. Edgar B. Kay, Tuscaloosa, Ala., is Engr.-in-Charge. Noted Aug. 20.

Canal Dover, Ohio—Fred Warther, Ch. Engr. of the municipal power plant, has recommended to the City Council the installation of an additional 350-hp. gas engine and generator, to cost about $20,000. If the new unit is installed, an addition to the present power station will be necessary. O. Salmond is Dir. of Pub. Ser.

East Liverpool, Ohio—It is reported that plans have been prepared for a municipal electric-light plant estimated to cost $60,000. J. C. Kelly is City Engr.

✚**Lowellville, Ohio**—The Ohio Iron & Steel Co. has awarded the contract for new boiler equipment for its furnace plant to the BABCOCK & WILCOX CO., 85 Liberty St., New York, N. Y., at $50,000.

Detroit, Mich.—It is reported that the City Council has authorized the City Controller to issue bonds for $350,000, the proceeds of which will be used for improving and extending the municipal lighting system. George Engle is City Controller.

Tipton, Iowa—At a recent election the citizens voted in favor of municipalizing the electric-light and power plant, now controlled by the Tipton Light & Heating Co.

Gayford, Kan.—The city is reported to be contemplating the establishment of a municipal electric-light plant to cost about $7000.

Cameron, Mo.—Press reports state that Harper & Stiles, 911 Grand Ave. Temple, Kansas City, Mo., are preparing plans for enlarging and improving the municipal electric-light system of Cameron. Plans include improvements to the power house and the installation of some new equipment. Clarence Staules is City Clk.

La Junta, Colo.—(Official)—We are advised by F. T. Lewis, City Engr., that the bond issue to be voted upon at the spring election, the proceeds of which will be used for the construction of a municipal electric-light plant, is for the sum of $75,000 instead of $7000 as noted in the issue of Dec. 17.

Tucson, Ariz.—It is reported that the City Council plans the installation of a new street-lighting system to cost about $35,000. J. Moss Ruthrauff is City Engr.

Ridgefield, Wash.—The Beattie-McClelland Shingle Mill Co. has been granted a franchise to furnish electric light for the city, and surrounding country, and will convert its mill building into a power station.

Gunnacevi (Durango) Mexico—It is reported that the Mexican Consolidated Mining & Milling Co. will install an electric-power plant at its mines at this point. Pumps will also be installed for taking the water from the workings of the mines.

BRIDGES

Fort Kent, Maine—(Official)—We are advised by Paul D. Sargent, Ch. Engr. of the State Highway Commission, Augusta, that on account of the Canadian authorities changing their minds, and owing to the fact that the appropriation from the State of Maine becomes void on Dec. 31, it is improbable that the bridge over St. Johns River between Fort Kent and St. Francis, N. B., will be built at present. Bids for the construction of this bridge were advertised for Dec. 21. Noted Dec. 17.

Niagara Falls, N. Y.—(A correction)—We are advised by F. S. Parkhurst, Jr., City Engr., that no plans are being prepared for the construction of a bridge at Second and Canal St.

Wallkill, N. Y.—(Official)—The Concrete-Steel Engineering Co., Park Row Bldg., New York, N. Y., has been engaged to prepare plans for the construction of a new bridge at Wallkill. It will be about 350 ft. long, 30 ft. wide, and the estimated cost is $25,000.

New Brunswick, N. J.—It is reported that the Board of Chosen Freeholders of Middlesex County is negotiating with the Pennsylvania R.R. for the construction of a new draw span in the Albany St. Bridge over the Raritan River. Alvin B. Fox, Perth Amboy, is County Engr.

✚Trenton, N. J.—The Pennsylvania R.R. has awarded the contract for the construction of substructures and approaches of new bridges at Greenwood and Hamilton Ave. to the BROWN-KING CONSTRUCTION CO., Philadelphia, Penn., at about $4000. Noted Dec. 10.

The Board of Chosen Freeholders has directed the County Engineer to prepare plans at once for the new bridge over Sanhican Creek at Lee Ave. It is hoped to advertise for bids and award the contract so that construction work may be started as soon as weather conditions in the spring permit. Theodore Tobish is County Engr. Noted Sept. 17.

✚Nanticoke, Penn.—(A correction)—The contract for the concrete piles required for the new bridge between Nanticoke and West Nanticoke was awarded to the McARTHUR CONCRETE PILE & FOUNDATION CO., 11 Pine St., New York, N. Y., instead of to the Raymond Concrete Pile Co. as erroneously noted in the issue of Dec. 24.

Wilkes-Barre, Penn.—A local art jury, at the request of the Board of Commissioners of Luzerne County, has suggested building a bridge over the Susquehanna River at West Market St. as a memorial to the citizens of the county who fought in the Civil War. A soldiers' and sailors' monument was originally planned, but the jury claims that no suitable site is available. F. R. Hendershot is County Controller.

Spartanburg, S. C.—The Southern Ry. is making preliminary arrangements for the construction of a new overhead concrete bridge on North Church St. to replace the present wooden structure at this point. W. H. Wells, Washington, D. C., is Ch. Engr. of Const. for the Southern Ry.

✚Delaware, Ohio—It is reported that the Commissioners of Delaware County have awarded the contract for the construction of a 340-ft. bridge over the Olentangy River to L. W. DEAN. It will be a five-span steel structure. Noted Sept. 24 and Oct. 15.

Hamilton, Ohio—It is reported that Fred M. Hammerle, County Engr. of Butler County, has begun preliminary surveys for the proposed Columbia Bridge over the Great Miami River at Wood St., Hamilton. The estimated cost of the structure is $90,000. It is hoped that bids may be asked about Mar. 1.

Indianapolis, Ind.—The Board of Public Works and the Board of Park Commissioners are preparing tentative plans for a new bridge over Fall Creek at Meridian St., to replace the present damaged structure. The new bridge will be about 300 ft. long, or 100 ft. longer than the present one. The estimated cost is $150,000. It is hoped to build the bridge next year. B. J. T. Jeup is City Engr.

Plymouth, Ind.—The City Council and the Board of Commissioners of Marshall County are considering the construction of a reinforced-concrete bridge over the Yellow River on Michigan St., Plymouth. The estimated cost of the structure is $30,000.

La Salle, Ill.—The State Highway Engineer has reported that the Shippingsport Bridge over the Illinois River at La Salle is beyond repair, and must be rebuilt. The estimated cost of a new bridge is $140,000 to be shared equally by La Salle County and the State. George Farnsworth, Ottawa, is County Supt. of Highways. Noted Oct. 15.

✚Columbus, Wis.—(Official)—The City Council has awarded the contract for the construction of the Beaver Dam Bridge to the WORDEN-ALLEN CO., Milwaukee. Eleven other bids were received for this work. Benjamin Paepke is City Clk. Noted Dec. 17.

Breckenridge, Minn.—(Official)—Bids will be received until Jan. 12 by P. E. Truax, Audr. of Wilkin County, for the construction of 10 county bridges, ranging from 20 to 26 ft. long. Noted Nov. 26 and Dec. 17.

Mankato, Minn.—The City Council is considering plans for the construction of a concrete bridge over the Minnesota River at Main St., to replace the present bridge which is said to be inadequate for increasing traffic. The proposed bridge is estimated to cost about $80,000. F. W. Bates is City Clk.

Anthony, Kan.—(Official)—Bids will be received until Jan. 11 by the Board of Commissioners of Harper County for the construction of five reinforced-concrete bridges, ranging from 23 to 299 ft. in length. D. B. Heacock, Attica, Kan., is Chn. Bd. of Comrs. Harris & Eastham, Hutchinson, Kan., are Engrs.-in-Charge. Noted Dec. 17.

Ottawa, Kan.—The Board of Commissioners has rejected for the second time all bids received for the construction of a bridge over the Marais des Cygnes River near Richter, as exceeding the appropriation of $8000. There were eight bids, ranging from $9100 to $12,692. Noted Nov. 12 and Dec. 10.

Salina, Kan.—Advertisements asking bids until Dec. 15, for the construction of a concrete bridge over the Smoky Hill River at Iron Ave., Selina, were withdrawn by the Board of Commissioners of Saline County, and it is reported that new bids will be received about Feb. 1. Wilmarth & Zerbe, Salina, are Engrs. in Charge. Noted Aug. 27, Nov. 12 and 26.

Turner, Kan.—(Official)—Bids will be received until noon, Jan. 4, by Frank M. Holcomb, Clk. of Wyandotte County, Kansas City, Kan., for building a concrete approach to the Turner Bridge. The Engineer's estimate is $9322. R. L. McAlpine is County Engr. Noted Dec. 17.

York, Neb.—Bids will be received until noon, Jan. 12, by H. F. Chapin, Clk. of York County, for bridge construction during 1915. About 15 bridges will be built, ranging in length from 12 to 70 ft.

✚Oklahoma, Okla.—(Official)—The Comimssioners of Oklahoma County have awarded the contract for the construction of two steel bridges to the OREGONIA BRIDGE CO., Lebanon, Ohio, and Oklahoma, Okla., at $5200. Noted Nov. 26.

✚Boise, Idaho—The State Highway Commission has awarded the contract for the construction of 11 reinforced-concrete culverts and bridges on the Idaho-Pacific Highway, to LONG & BLODGETT, Gooding, Idaho.

✚Logan, Utah—The Commissioners of Cache County will, on Jan. 2, award contracts to L. J. ROSS for three county bridges as follows: Benson Bridge, 125 ft. long, at $4950; span of 50 ft. over Muddy Creek near Lewiston, $2950, and 100-ft. bridge over the railway creek at Millville, $3750.

Tucson, Ariz.—The city plans to build a new reinforced-concrete bridge across the Santa Cruz River at Congress St., to cost about $35,000. The bridge will be about 130 ft. long, with a 26-ft. roadway and two 7-ft. sidewalks. J. M. Ruthrauff is City Engr. Noted Nov. 26.

Sacramento, Calif.—Bids will be received until Jan. 5, by the Board of Supervisors of Sacramento County, for the construction of a bridge on the Folsom-Orangevale Rd. Estimated cost, $6300. E. F. Pfund is Clk., Bd. of Supvrs.

Santa Barbara, Calif.—It is reported that the Board of Supervisors of Santa Barbara County will soon call a special election to vote on the question of issuing $50,000 in bonds to be used for the construction of new bridges in the county.

Hamilton, Ont.—(A correction)—We are advised by the Canada Cement Co., Ltd., Montreal, Que., that it is not preparing plans for a concrete bridge in connection with the Toronto-Hamilton Highway, as this company does no business other than the manufacture of cement. Noted Dec. 10.

Ottawa, Ont.—(Official)—Bids will be received until Jan. 28 by the City Council for the construction of the substructure of the Pretoria Ave. Bridge. F. C. Askwith, City Engr., will have charge of the work. L. McL. Hunter is Roadway Engr. Noted Oct. 22 and Nov. 5.

✚Quinlan & Robertson, Montreal, general contractors for the Don Section of the Bloor St. Viaduct, have awarded a cub-contract for 12,800,000 lb. of structural steel to the HAMILTON BRIDGE WORKS CO., Hamilton, at about $400,000. Noted Dec. 17 and 24.

Winnipeg, Man.—(Official)—Plans have been prepared by Paul Schioler, Bridge Engr., of the City of Winnipeg, for the construction of four bridges across the Assiniboine River. Each bridge will be about 400 ft. long, with a 42-ft. roadway, two 10-ft. sidewalks, and double street-car tracks. The estimated total cost is $600,000. It is expected that bids will be asked as soon as the funds for their construction have been voted. W. P. Brereton is City Engr. Noted Nov. 12.

★Santo Domingo, Dominican Republic—Bids were received Oct. 15 by the Director General of Public Works for the construction of a steel highway bridge over the Ozama River at santo Domingo City from José Turull, Santo Domingo City, $91,236; Turull, Malla & Co., Santo Domingo City, $94,406; Snare & Triest Co., New York, N. Y., $97,469; C. D. Ridgway, Jr., Santo Domingo City, $97,931; Z. H. Garcia, Santo Domingo City, $99,102; John Monks & Sons, New York, N. Y., $125,697; P. J. Carlin Construction Co., New York, N. Y., $163,297. Noted June 11 and Sept. 3.

WATER SUPPLY—IRRIGATION

Boston, Mass.—Bids will be received until Jan. 6, by the Supply Department for 3965 tons of 4- to 30-in. water pipe and specials. D. Frank Doherty is Supt. of Supply Dept.

Albion, N. Y.—(Official)—The F. F. Wittmer Engineering Co., Dun Bldg., Buffalo, has prepared plans for either the installation of mechanical filters for the purification of water from a creek or from wells. Bonds have been voted for this work. Noted Aug. 6.

Lyons, N. Y.—(Official)—The citizens have voted bonds, the proceeds of which will be used for the purchase of the private water company. Plans have been prepared by J. F. Wittmer Engineering Co., Dun Bldg., Buffalo, N. Y., and approved by the State Board of Health for the construction of a gravity mechanical filter plant in two units and for the extension of the distribution system. Pipe for this work has already been purchased.

✚New York, N. Y.—(Borough of Brooklyn)—(Official)—Contracts for removing the present foundation and erecting a new foundation under the water ends of No. 1 Worthington

20 Mg triple expansion pumping engine at the Ridgewood North Side pumping station, for removing two boilers and their appurtenances from the Milburn pumping station, transporting and reërecting one in the Woodhaven pumping station and one in the Agawam pumping station with new stacks, piping and other appurtenances, have been awarded to CAMPBELL & SMILEY, at $3092, for work at the Ridgewood North Side pumping station and to RUDOLPH GERSMAN, at $3462, for work at the Woodhaven pumping station. Noted Dec. 3 and Dec. 17.

✚Camden, N. J.—The contract for c.-i. pipe, specials and fire hydrants has been awarded to R. D. WOOD & CO., Philadelphia, Penn.

Freehold, N. J.—The Board of Public Utility Commissioners has granted the Monmouth County Water Co. permission to issue bonds for $81,000, the proceeds of which will be used for the improvement of the water system.

Jersey City, N. J.—(Official)—Bids will be received until 2 p.m., Jan. 7, by the Board of Commissioners for c.-i. pipe. M. I. Fagan is City Clk.

Newark, N. J.—Bonds for $200,000 have been sold the proceeds of which will be used for making extensions to the watershed. Tyler Parmly is City Controller.

West Orange, N. J.—According to press reports Alexander Potter, Consult. Engr., 50 Church St., New York, N. Y., is preparing plans for the construction of a 24-in. water main in West Orange, to the Thomas A. Edison works Carl Fentz is Chn. of the Water Comn. Noted Aug. 20.

Ford City, Penn.—Bids will be received until Jan. 4, by D. O. Crouch, Borough Secy. for an 18-in. low lift centrifugal pump.

✚Baltimore, Md.—The contract for constructing a pumping station near the Pimlico entrance to Druid Hill Park has been awarded to D. M. ANDREW CO., Baltimore, at $15,500.

Tarpon Springs, Fla.—All bids received for materials for making extensions to the water and sewer systems have been rejected. The contract will be readvertised soon. J. B. McCrary Co., 1408 Third National Bank Bldg., Atlanta, Ga., is Engr.

✚Bay Minette, Ala.—The contract has been awarded to J. W. GURLEY, Mobile, at $32,000 for constructing a water system, sewer system and electric-light plant. Bids were opened Dec. 15. Noted Dec. 3.

✚Nashville, Tenn.—The contract has been awarded to T. I. CURTIS & SONS, Nashville, at $4184 for laying about 15,000 ft. of water mains.

Sebree, Ky.—Bids will be received until Jan. 4, by the City Clerk for the purchase of $14,000 in bonds, the proceeds of which will be used for the construction of a water system. Noted Dec. 3 and Nov. 19.

Akron, Ohio—An election will probably be held to vote on the question of issuing $500,000 in bonds, the proceeds of which will be used for the completion of the water system.

✚Cleveland, Ohio—The contract has been awarded to W. L. BAYARD, Philadelphia, Penn., at $133,500, for installing a filter and equipment at the filtration plant. Bids opened Dec. 8. Noted Dec. 17.

Cleveland, Ohio—(Official)—Bids were received, Dec. 18, by the Commissioner of Purchases and Supplies for fire hydrants and sluice gates as follows: Pittsburgh Valve Foundry & Construction Co., Pittsburgh, Penn., $3900; Coffin Valve Co., Neponset, Mass., $4256; Bruce Macbeth Engine Co., Cleveland, Ohio, $4264; Coldwell-Wilcox Co., Newburgh, N. Y., $4500; Cleveland Machine & Mfg. Co., Cleveland, Ohio, $5000 and Roe Stephens Mfg. Co., Detroit, Mich., $5000. Noted Dec. 10.

Findlay, Ohio—(Official)—We have been advised that the Illinois Pipe Line Co. does not intend to build a pipe line from Columbia to Van Wert County. Noted Dec. 17.

Lima, Ohio—At the next meeting of the City Council, Carl Bryson, City Engr., will present plans for the construction of an upper reservoir and for drilling wells. The estimated cost is $70,000. Noted Sept. 24.

Lorain, Ohio—Bonds for $103,151 will be issued by the Council, the proceeds of which will be used for the improvement of the water system. Noted Aug. 6.

New Boston, Ohio—(Official)—Bids will be received until noon, Jan. 11, by the Village Council for completing the water system. Thomas D. O'Neal is Clk.

Shaker Heights (Cleveland post office), **Ohio**—Bids will be received until noon, Jan. 19, by Carl A. Palmer, Village Clk., First National Bank Bldg., Cleveland, Ohio, for laying 6-in. water mains. B. W. Willard, 804 Marshall Bldg., Cleveland, is Village Engr.

South Newburgh (Newburgh post office), **Ohio**—Bids will be received until Jan. 30, by H. H. Bohning, Clk., for the purchase of $31,000 in bonds, the proceeds of which will be used for the installation of a water system.

Benton Harbor, Mich.—Bonds for $60,000 were voted by the citizens at a recent election. The proceeds will be used for the improvement and extension of the water system. B. Spaulding is City Clk. oted Dec. 3.

Anna, Ill.—According to press reports bids will be received in January for making extensions to the water system. E. S. Alden is Pres. of the Bd. of Local Improvt.

Clinton, Ill.—At a recent election the citizens defeated the question of issuing $8000 in bonds, the proceeds of which would have been used for the repair of the water system.

✚Hinsdale, Ill.—The contract has been awarded to KENNICOTT CO., Chicago Heights, Ill., at $18,054, for installing a water softening plant at the water works. Bids opened Nov. 16. Noted Oct. 29.

Buffalo Center, Iowa—The citizens contemplate issuing bonds, the proceeds of which will be used for the extension of the water system and for the construction of an electric-light plant. C. H. Galagan is City Clk.

✚Council Bluffs, Iowa—According to press reports the contract has been awarded to CAST IRON PIPE CO., Kansas City, Mo., for 16,600 ft. of c.-i. pipe.

Crawfordsville, Iowa—Press reports state that bids will be received in February for the construction of a water system estimated to cost $10,000.

✚Ottumwa, Iowa—(Official)—Bids were received, Dec. 18, by the Board of Water Works Trustees, for constructing concrete dams as follows: J. W. TURNER IMPROVEMENT CO., Des Moines, at $50,880 (awarded contract); W. B. Saunders, Minneapolis, Minn., $52,605; A. J. Martin & Co., Augusta, Ga., $53,640; Hannan, Hickey Bros. Construction Co., St. Louis, Mo., $54,000; Middleton & Ludlow, Kansas City, Mo., $57,953; and Inter-Mountain Bridge & Construction Co., Tecumseh, Neb., $62.500. Horace A. Brown is Supt. of Water Wks. Noted Dec. 10.

Salem, Iowa—At a recent election the citizens defeated the bond issue, the proceeds of which would have been used for the construction of a water system.

Fort Scott, Kan.—Plans have been submitted to the State Board of Health for the construction of a mechanical filtration plant. The estimated cost is $30,000. Noted Oct. 29.

Springfield, Mo.—According to press reports the Springfield Water Co. will make improvements costing $100,000. H. B. McDaniel is Treas. and Mgr.

Wilburton, Okla.—(Official)—The Benham Engineering Co., Oklahoma City, Okla., has been retained by the City Council to prepare plans and to supervise the improvement of the water and sewer systems. Noted Dec. 17.

Twin Falls, Idaho—The Public Utilities Commission has been petitioned by Twin Falls to approve of the construction of a water system at Twin Falls. Noted Aug. 6.

Escalante, Utah—The citizens plan to install a water system at an estimated cost of $45,000.

Salt Lake City, Utah—Sylvester Q. Cannon, City Engr., according to press reports, will award contracts the first of the year for work in connection with the water system, estimated to cost $153,000.

Huntington Beach, Calif.—The Huntington Beach Water Co. plans to install additional pumping machinery.

Seattle, Wash.—The Council contemplates replacing the 36-in. and 42-in. water main in 12th Ave. N., from Volunteer Park to Denny Way with steel pipe.

✚Orillia, Ont.—The contract has been awarded to INTERNATIONAL FILTER CO., Chicago, Ill., at $14,465 for the installation of a filtration plant.

✚Saskatoon, Sask.—(Official)—The contract has been awarded to A. G. SANGSTER, at $36,051 for laying a 24-in. pipe under the South Saskatchewan River. J. Jonsson is Assistant Engr. Noted Dec. 17.

SEWERS

East Rochester, N. Y.—A special election will be held, Jan. 2, to vote on the question of issuing $41,700 in bonds, the proceeds of which will be used for constructing a sewer in Main St., and for paving and curbing.

Lyons, N. Y.—(Official)—Plans have been prepared by J. F. Wittmer, Dun Bldg., Buffalo, and approved by the State Department of Health, for the construction of Imhoff tanks and contact beds for the sewer system. Bonds for this work were voted in June. Noted July 2.

Yorkville, N. Y.—The construction of sewers in Myers Ave., Cooper Ave., Erie St. and Tabor Pl. is contemplated by the Board of Trustees.

✚✚Dunellen, N. J.—(Official)—The contract has been awarded to H. K. CORBIN, 170 Broadway, New York, N. Y., at $82,604 for constructing a sewage collecting system. Noted Dec. 24.

✚Edgewater, N. J.—The contract for constructing sewer outlet No. 12 has been awarded to JOHN J. McGARRY, at $16,063.

Jersey City, N. J.—See item under "Streets and Roads."

✚✚Newark, N. J.—(Official)—The contract will be awarded to CENEDELLA CO., Milford, Mass., at $160,741 for constructing Section 14 of the Main Intercepting Sewer in Passaic. Bids opened Dec. 22. Noted Dec. 3.

★North Plainfield, N. J.—(Official)—Bids were received, Dec 8, by the Borough of North Plainfield for a sewage collecting system and outfall sewer as follows: Contract No. 1, Harrison & Burton Co., New York, N. Y., $72,598; John C. Schrade Inc., Brooklyn, N. Y., $72,772; H. C. Brooks Co., Martinsburg, W. Va., $77,322; Frank Puglia, Paterson, N. J., $78,102; D. Donnegan Co. & F. N. Lewis, Brooklyn, N. Y., $78,788; Cantrell Construction Co., Philadelphia, Penn., $84,314; Peekskill Construction Co., Peekskill, N. Y., $85,924; Cauldwell-Wingate Co. & Atlantic Construction & Supply Co., New York, N. Y., $86,899; Burke & Bonham Inc., Plainfield, N. J., (irregular), $87,073; Joseph L. Sigretto & Co., Woodhaven, N. Y., $87,393; Kelly-McFeeley Co., Camden, N. J., $92,308; Bruno Pizzimenti, Seneca Falls, N. Y. (irregular), $93,042; Fusco Contracting Co., Newark, N. J., $93,148; Schneider Stelle & Co., New Brunswick, N. J., $94,314; Joseph Johnson's Sons, West New Brighton, N. Y. (irregular), $95,934; Weldon Contract Co., Rahway, N. J., $98,300. Canedella, Orange, N. J., $111,792.

Collecting system, Contract No. 2; A. D. Ambrosio & Co., Hartford, Conn. (irregular), $63,878; Frank Puglia, Paterson, N. J., $70,817; Harrison-Burton Co., New York, N. Y., $74,342; Schneider-Stelle & Co., New Brunswick, N. J., $275,730; DiNapoli & Toriello Contracting Co., Hackensack, N. J., $75,926; Martin & Miller, Elizabeth, N. J., $77,214; Cauldwell-Wingate Co., and Atlantic Contracting & Supply Co., Association, New York, N. Y., $83,064; Joseph L. Sogretto & Co., Woodhaven, N. Y., $84,300; Weldon Contracting Co., Rahway, N. J., $88,996; Joseph Johnson's Sons, West New Brighton, N. Y., $91,062; Briggs & McLoughlin Contracting Co., New York, N. Y., $96,713; Kelley McFeeley Co., Camden, N. J., $98,282; Burke & Bonham Inc., Plainfield, N. J., $99.738. Noted Nov. 19.

Allentown, Penn.—Bids were received, Dec. 15, for constructing storm water sewers in East Maple St., as follows: Frank Cannon, Allentown, $15,906; S. W. Chiles, South Bethlehem, $15,968; Middletown Thompson Co., Baltimore, Md., $19,820 and R. S. Rathbun, Allentown, $26,079, were the low bidders Noted Dec. 3.

Moorefield, W. Va.—The citizens at a recent election voted in favor of issuing bonds for $8000, the proceeds of which will be used for the installation of a sewer system.

Starke, Fla.—Surveys have been made by the J. B. McCrary Co., Atlanta, Ga., for the construction of a sewer system.

Tarpon Springs, Fla.—See item under "Water Supply and Irrigation."

West Palm Beach, Fla.—Bids will be received until Jan. 5, by L. T. Lockwood, Pres. of the City Council, for making improvements to the sewer system. Noted Nov. 26.

Bay Minette, Ala.—See item under "Water Supply—Irrigation."

Bowling Green, Ky.—The Southern Asphalt & Construction Co., Birmingham, Ala., has been authorized by the City Council to prepare plans for the construction of a sewer system with septic tank and purification beds.

Piqua, Ohio—Bids will be received by Albert Schroeder, Dir. of Pub. Ser., until Jan. 7, for constructing a storm sewer in Ash St. from Lincoln to Washington Ave.

Sandusky, Ohio—Bonds for $72,000 have been sold, the proceeds of which will be used for constructing sewers.

Bloomington, Ind.—(Official)—Bids will be received until 7:30 p.m., Jan. 5, by the Common Council for constructing a sewer in University St. Horace Blakely is City Clk.

†Indianapolis, Ind.—The contract for building a main sewer in Prospect St., from Pleasant Run to Sherman Drive, has been awarded to the AMERICAN CONSTRUCTION CO., at $21,624. Noted Dec. 3.

Superior, Wis.—Press reports state that the City Commission has decided to construct a main sewer, estimated to cost $18,000.

Bettendorf, Iowa—According to plans prepared by A. M. Compton, City Engr. the construction of the west end sewer system will cost $20,598. The system will be 25,598 lin.ft. in length and of 8-, 10-, 12- and 15-in. vitrified pipe.

†Keota, Iowa—The Town Council has awarded contracts for constructing a sewage-disposal plant, pipe and specials to the OFFERMAN CONSTRUCTION CO., and five miles of sanitary sewers to C. E. HUGHES, Rockford, Ill., at $15,996. Noted Nov. 26 and Dec. 24.

Hibbing, Minn.—(Official)—Plans have been prepared and submitted by Burns & McDonnell, Kansas City, Mo., Engrs., for the construction of storm water and sanitary sewers in the Alice addition, estimated to cost $152,000 and $65,000, respectively.

Wilburton, Okla.—(Official)—See item under "Water Supply—Irrigation."

Texarkana, Tex.—The City Council contemplates installing a storm sewer system.

Pueblo, Colo.—The City Council contemplates an expenditure of $50,500 for constructing a storm sewer.

†Salt Lake City, Utah—A contract for constructing sewer extension No. 336 has been awarded to W. M. GIBSON, Grand Junction, Colo., at $57,893.

†Seattle, Wash.—The contract for constructing a concrete sewer in 37th Ave. S. has been awarded to the HARBOR PAVING CO., Hoge Bldg. at $31,262.

Reedley, Calif.—The State Board of Health has ordered the City Council to build a sewage disposal plant.

Lindsay, Ont.—Press reports state that the Town Council is having plans prepared for a sanitary sewer and cellar drain in Regent St., estimated to cost $4940. A. J. Williams is Engr. and Town Comr.

Ottawa, Ont.—According to press reports the City Council contemplates constructing a tile pipe sewer in Bank St.

Ottawa, Ont.—Press reports state that an election will be held, Jan. 4, to vote on the question of issuing $260,000 in bonds for the South Ottawa intercepting sewer.

GARBAGE

New York, N. Y.—(Borough of Queens)—(Official)—Due to the numerous applications for specifications and blank forms for submitting bids, the demand for which the Borough President could not supply, all bids received on Dec. 22 for the construction of the destructor plant in Ridgewood, have been rejected. The work will be readvertised shortly. Noted Dec. 17.

North Bergen—(Weehawken post office), **N. J.**—The lowest bid received for the removal of garbage was that of Michael Volpe, West New York, N. J., at $2800. Patrick A. Brady is Township Clk. Noted Dec. 10.

Jacksonville, Fla.—Bids will be received by the Commissioner of Public Works, Board of Trustees, until Jan. 11, for the removal and disposal of dead animals and refuse collected at the city markets.

Lansing, Mich.—Bids will be received until Jan. 16, by John McClellan, City Clk., for the disposal of the city's garbage.

★Hibbing, Minn.—(Official)—Bids will be received until 8 p.m., Dec. 29, by D. D. Haley, Village Recdr., for an incinerator which will dispose of the usual garbage collection in the village of Hibbing. For details see advertisement under "Contracts To Be Let."

San Antonio, Tex.—According to press reports the city has rejected all bids received recently for installing a garbage incinerator.

Ottawa, Ont.—Jan. 4 has been designated as the day when the citizens will vote on the proposed bond issue of $50,000 for the installation of a garbage incinerator. Noted Nov. 26.

STREETS AND ROADS

†Boston, Mass.—The contract for constructing a bituminous macadam roadway in Deering Rd., Dorchester District, has been awarded to J. C. COLEMAN & SONS CO., at $6521. Other bids were: Agostino De Stefano, $6621; John Kelly, $6926; Martino De Matteo, $7000; John F. Beatty, $7169; P. F. Donovan, $7205; James Doherty, $7222; W. J. Barry, $7442; John Landis, $7445; J. J. McCarthy, $7665; John F. Lynch, $7749. Noted Dec. 17.

†Hartford, Conn.—The contract for the construction of a section of trap rock macadam on the East Haddam Rd., bids for which were received Nov. 30, has been awarded by the State Highway Commission to LEONARDO SUZIO, Meridian, Conn., at $8000. Noted Nov. 19 and Dec. 10.

Buffalo, N. Y.—The City Council has ordered Beatrice and Henrietta St. to be paved with asphalt, at an estimated cost of $16,124 and 18,234 respectively.

†Buffalo, N. Y.—The contract for repaving Breckenridge St. from Richmond to Elmwood Ave. has been awarded to the GERMAN ROCK ASPHALT CO., at $13,800.

Port Dickinson, N. Y.—Bids will soon be received by the Board of Trustees for the sale of $39,000 in bonds for paving Chenango St.

Freehold, N. J.—Bids will be received by the Board of Freeholders until Jan. 4 for improving a section of Norwood Ave., Borough of Deal and Allenhurst, with amiesite. G. D. Cooper, Red Bank, is County Engr.

Jersey City, N. J.—The Board of City Commissioners has instructed Charles Van Keuren, City Engr., to prepare plans for improvements in the Marion and West End sections as follows: Cutting through of Van Winkle Ave. to Summit Ave., with formation of a 90-ft. improved thoroughfare; cutting through of Bevan St., Frazer Pl. and other short streets running between West Newark Ave. and Van Winkle Ave. All to be paved, curbed and sewers constructed therein.

Newark, N. J.—Revised plans for the improvement of Washington St. at its intersection with Market St., and for extending Freylinghuysen Ave., have been completed. Estimated cost, exclusive of property to be bought, about $460,000.

†Princeton, N. J.—The Common Council has awarded a contract to the HASTINGS PAVEMENT CO., New York, for the installation of asphalt block paving on 6-in. concrete foundation on Mercer St., in the park section.

Union, N. J.—The lowest bid received by the Board of Council for repaving Palisade Ave. was submitted by the Clinton Contracting Co., at $31,560. Sebastian Maulbeck is Town Surv.

Vineland, N. J.—According to press reports the question of issuing $100,000 in bonds for paving Landis Ave. was defeated at the general election.

West Hoboken, N. J.—The Town Council has approved plans for the improvement of Barclay St., from Palisade to Clinton Ave., and authorized the advertising of bids. John E. Bowe, West New York, is Engr. Noted Dec. 17.

West Reading, Penn.—A special election will be held Jan. 12 to vote on the question of issuing $25,000 in bonds for street improvements.

Bland, Va.—The citizens of Seddon Magisterial District, Bland County, will vote Feb. 16, on the question of issuing $30,000 in bonds for road and bridge improvements.

Quaker Gap, N. C.—The citizens will vote Jan. 19 on the question of issuing $50,000 in bonds for building roads.

Southport, N. C.—Bonds for $35,000 have been sold, the proceeds of which will be used for improving roads.

Aiken, S. C.—See item under Federal Government Work. Road—Aiken, S. C. Noted Dec. 10.

Birmingham, Ala.—The Board of Commissioners voted in favor of macadamizing and constructing concrete walks on 30th, 39th St. and Fifth Pl., estimated to cost $11,900.

Alexandria, La.—According to press reports, bids will be received by the City Secretary until Jan. 4 for improving a section of Third St.

Ama, La.—All bids for the extensive road building work in St. Charles Parish were rejected because of technicalities New bids will be asked for, to be opened late in January. The proposed roads are to be of gravel construction.

Hahnville, La.—The following bids were received by the Police Jury for constructing gravel roads in Road District No. 3, St. Charles County: Lasseigne & Lambert Bros., $44,659; St. Charles Construction Co., $54,503, and Boyd & Bradshaw, Columbia, Miss., $65,210. Noted July 2.

Lake Charles, La.—See item under "Miscellaenous," Drainage.

Manchester, Tenn.—According to press reports at the election held Dec. 5, the question of issuing $12,000 in bonds for constructing roads was defeated. Noted Nov. 19.

Louisville, Ky.—The Board of Public Works will receive bids until Jan. 28 for the construction of Hill St. from Fourth to Sixth with bituminous concrete, estimated to cost $8000.

Pineville, Ky.—Press reports state that the citizens of Bell County will vote Feb. 13, on the question of issuing $250,000 in bonds for constructing roads and bridges. W. C. Bingham is County Clk.

Cincinnati, Ohio—(Official)—Bids will be received by Philip Fosdick, Dir. of Pub. Ser., until noon, Jan. 4, for improving a section of arrison Ave.

St. Marys, Ohio—The Board of Sinking Fund Trustees has authorized the sale of $17,000 bonds for the improvement of Spruce St.

New Albany, Ind.—Bids will be received by the Board of Public Works until Jan. 28 for paving Galt St. from Main to Dewey St. with macadam.

†Vincennes, Ind.—The contract for improving Fourth St. has been awarded to the PREMIER CONSTRUCTION CO., Indianapolis, at $52,079.

†Port Huron, Mich.—A contract for constructing a state trunk highway has been awarded by the Commissioners of St. Clair County, to the PORT HURON BLDG. CO., Port Huron, at $11,564. Noted Nov. 26.

Aitkin, Minn.—Bids will be received by J. B. Lemire, County Audr., until 10 a.m., Jan. 6, for constructing 6½ miles of county road between Shovel Lake townsite and Hill City.

Anthony, Kan.—(Official)—Bids will be received by the Commissioners of Harper County until Jan. 11 for constructing seven roadways. Harris & Eastham, Hutchinson, Kan., is Engr.

Junction City, Kan.—Press reports state that bids will be received until Jan. 5, by the Board of County Commissioners, for paving approximately 5000 sq.yd. of roadway, 16 ft. wide, with concrete. W. V. Bucks is County Engr.

Minot, N. D.—Bids will be received by H. E. Wheeler, Clk. of the Park Bd., until 4 p.m., Jan. 5, for graveling Park Rd. in Riverside Park.

Anderson, Tex.—The citizens of District No. 4, Grimes County, will vote Jan. 2, on the question of issuing $60,000 in bonds for constructing macadam, gravel and paved roads. Noted Dec. 10.

Cuero, Tex.—(Official)—We have been advised that the citizens do not intend voting on a bond issue. Noted Dec. 10.

†Marshall, Tex.—The contract for paving West Rusk St. from Adkins to Bishop St. with asphalt macadam has been awarded to the BERT HAHN CONSTRUCTION, Dallas.

Sulphur Springs, Tex.—Bids will be received by the City Secretary until Jan. 19 for approximately 35,000 sq.yd. of paving, 20,000 sq.yd. concrete curb and 12,000 cu.yd. earth excavation. A. D. Stivers is City Engr.

Fallon, Nev.—In the issue of Dec. 10 we stated that at the general election the question of issuing $50,000 in bonds carried, but have since learned that it was defeated. Noted Dec. 10.

North Yakima, Wash.—City Council has instructed N. A. Gilliman, City Engr., to prepare plans for paving First Ave. with brick, laid on concrete base. Work will be ordered early in the year.

†Port Angeles, Wash.—A contract for road improvements in Improvement District No. 24 has been awarded to P. J. WOODS at $31,596.

†Spokane, Wash.—The contract for paving South Market St. has been awarded to the SPOKANE BITUMINOUS CO., at $4200.

Portland, Ore.—The lowest bid received by the City Council for the grading and construction of sidewalks in 62d St., from Powell Valley Rd. to Foster Rd., was submitted by Bodman & Burge at $5873.

Bakersfield, Calif.—Bids will be received until 10 a.m., Jan. 9, for constructing 11½ miles of the Bakersfield-Taft Rd. I. R. Miller is Clk. of the Supvrs. of Kern County.

Calexico, Calif.—This city will pave Imperial Ave. from a point between Sixth and Seventh St. to the railroad right-of-way; Second St. and First St., between the Southern Pacific tracks and Heffernan St., Heffernan to Third, and thence west to the depot, and Paulin and Rockwood, between First and Third St.

†Compton, Calif.—C. SCHEERER, 512 Stimson Bldg., Los Angeles, has been awarded the contract at about $19,000 for improving portions of Oleander and Almond St.

†Los Angeles, Calif.—F. W. WHITTIER has been awarded the contract, at $10,830, for improving Marguerite St., from its easterly terminus to Avenue 33.

Sacramento, Calif.—(Official)—Bids were received Dec. 14, by the State Highway Commissioners, for constructing roads in the following counties: (a) Siskiyou County, (b) Otter County, (c) Los Angeles County (work to be done in 450 days), (d) Los Angeles County (250 days), (e) Los Angeles County (150 days), (f) Orange County—Blanchard-Brown Co., San Francisco, (a) $128,316; Palmer & McBryde, San Francisco, (a) $154,265, (e) $485,373; James Fitzpatrick, Sacramento, (a) $126,330; Berry Mackie & Co., San Francisco, (a) $90,653; Smith & Brice, Eureka, (a) $105,715, (d) $405,389, (e) $414,914; E. T. Johnson, Portland, Ore., (a) $90,522, (b) $54,472; F. Rolandi, San Francisco, (a) $116,001; Taylor & Berliner, Los Angeles, (b) $49,791; Chico Construction Co., Chico, (b) $49,582; P. L. Burr, San Francisco, (b) $53,455; Tieslau Bros., San Francisco, (b) $56,696; L. F. Gerdetz, San Francisco, (b) $59,461; C. H. & A. W. Garrill, San Francisco, (b) $42,381; Bates, Borland & Ayer, Oakland, (b) $51,887; Whitlock & Gorrill, San Francisco, (b) $48,917; Forest City Paving & Construction Co., San Francisco, (b) $48,674; H. A. Taylor, Los Angeles, (c) $391,822; F. A. Keasal, San Francisco, (c) $34,500; Chadwick & Sykes, Inc., San Francisco, (c) $498,708; Lynn S. Atkinson, Los Angeles, (c) $630,810; Lee Moor Contracting Co., Los Angeles, (c) $256,246, (d) $268,946, (e) $281,646; A. C. McLean Construction Co., San Francisco, (c) $315,895, (d) $328,595, (e) $343,155; Twohey Bros. Co., San Francisco, (c) $300,897, (d) $304,071, (e) $326,296; Mahoney Bros., San Francisco, (c) $308,565, (d) $314,915, (e) $333,965; Richard Rothwell & A. H. McCray, Los Angeles, (c) $520,507; Warren A. Bechtel, Alton, Calif., (d) $553,01; Charles Daley & Co. and Hans Pederson, Seattle, Wash., (d) $367,597; Callahan & Hedrick, El Centro, (f) $45,344; the M. A. Co., Inc., Los Angeles, (f) $35,831; Modern Construction Co., Inc., (f) $40,763. Noted Dec. 3.

Salinas, Calif.—Press reports state that bids will be received by T. P. Joy, County Clk., until Jan. 5, for the sale of $570,000 in bonds for constructing roads.

San Diego, Calif.—Bids will be received by the Board of Supervisors until 2:30 p.m. of Jan. 6, for constructing about 2½ miles of paved highway to extend from a point near Laes at Tia Juana to Snell's Corner. It will have a 20-ft. center of bitulithic macadam and 8 ft. sides of oiled granite. J. T. Butler is County Clk.

†San Francisco, Calif.—The Board of Public Works has awarded a contract for the paving of a 30-ft. strip on Sloat Blvd., to BLANCHARD & BROWN, at .169c. per sq. ft. The total cost of the work will be $58,400.

Santa Ana, Calif.—Bids will be received by the Board of Supervisors until 2 p.m., Jan. 6, for the construction of about 2¼ miles of Sec. 2, Anaheim-Olive Rd. The work comprises 6330 cu.yd. excavation, 11,516 lin.ft. shaping roadbed, 14 cu.yd. concrete, 2560 cu.yd. concrete in pavement and 870 lb. reinforcing steel. S. H. Finley is Chief Engr.

Vacaville, Calif.—At the election held Dec. 14, the citizens voted in favor of issuing $30,000 in bonds for street improvements. Noted Dec. 10.

Willows, Calif.—According to press reports the City Trustees will soon receive bids for paving five blocks.

INDUSTRIAL WORKS

Worcester, Mass.—The Mills Woven Cartridge Belt Co. plans the construction of a three-story, 50x120-ft. addition. Estimated cost, $25,000.

Buffalo, N. Y.—The Atlas Works of the Standard Oil Co. will construct a one-story, 55x147-ft. steel storehouse addition on Elk St. and the Buffalo Creek R.R. H. P. Chamberlain is manager.

Syracuse, N. Y.—Bids are being received by Taber & Baxter, Archs., for the construction of a two-story and basement, 35x80-ft. addition to the Sheet Metal Works, 921 North State St., for the H. E. Hessler Co., 521 North Salina St. Estimated cost, $20,000.

Watertown, N. Y.—The Gould Automobile Co. will build a two-story and basement, 50x150-ft. garage. William Gould, 223 King St., is Pres.

†Newcastle, Del.—The contract for the construction of the first group of buildings for the Bethlehem Steel Co. has been awarded to WILLIAM STEEL & SONS CO., Philadelphia, Penn. Estimated cost, $100,000. Noted Nov. 12.

Baltimore, Md.—Plans are being prepared by Haskell & Barnes, 301 North Charles St., for the construction of an 18x60-ft. factory on Paca and Mulberry St. Estimated cost, $14,000.

†Norfolk, Va.—The contract for the construction of a two-story, 50x215-ft. building for the Davis Bakery, has been awarded to W. H. SAUNDERS, Norfolk. Estimated cost, $20,000.

Richmond, Va.—The Spence-Nunnamaker Co. plans the construction of a three-story fireproof brick warehouse on 17th St. Estimated cost, $16,000.

Roanoke, Va.—The Hammond Printing & Lithographing Works plans the construction of a four-story reinforced-concrete shop. The estimated cost is $40,000.

Columbia, S. C.—The Columbia, Newberry & Laurens R.R. plans the rebuilding of its roundhouse and repair shops, recently destroyed by fire with a loss of $15,000.

Jacksonville, Fla.—The Atlantic Coast Line R.R. will construct export terminals to be one-story, 127x267 ft. and cost $27,000. E. B. Pleasants is Ch. Engr.

Newellton, La.—Oscar Jones, Chrisman, Ill., and others, are planning the construction at Newellton of a 50,000-bu. grain elevator.

†New Orleans, La.—The Board of Commissioners of the Port of New Orleans awarded the contract for the construction of cotton warehouses and a terminal to the JEFFERSON CONSTRUCTION CO., New Orleans, at $1,323,444. Noted Nov. 5 and Dec. 24.

Memphis, Tenn.—The Illinois Central R.R. plans the construction of an icing plant in Nonconnah Yards. The estimated cost is $165,000.

Cleveland, Ohio—J. B. Davis & Co., Archs., 207 Arcade Bldg., are preparing plans for the construction of a 50x400-ft. addition to the Union Rolling Mills Co. at Aetna Rd. and Penn. R.R.

Detroit, Mich.—Plans are being prepared by H. S. Angell, 722 Free Press Bldg., for the construction of a two-story, 30x100-ft. factory for Gordon-Pagel Co., 461 Chene St. Estimated cost, $40,000.

Monroe, Mich.—The Van Block Motor Co. contemplates constructing a two-story factory addition, estimated to cost $10,000.

†Chicago, Ill.—The contract for the construction of a four-story and basement, 90x109-ft. factory, at 2341-43 Wabansia Ave., for the Burkland Knitting Works, 538 South Dearborn St., has been awarded to the WIEBOLDT CONSTRUCTION CO., 1534 West Van Buren St.

The Hardstone Brick & Tile Co. plans the construction of a four-story, 75x300-ft. factory and a two-story, 25x75-ft. office building, on 66th St., and 59th Ave. Estimated cost, $50,000.

Ashland, Wis.—The Ashland Cigar & Tobacco Co. contemplates constructing a 74x140-ft. factory and warehouse.

†Laporte City, Iowa—The contract for the construction of a glove factory for the United Glove Co., has been awarded to O. W. ARMAGAST. Estimated cost, $10,816.

Brainerd, Minn.—John Zeta contemplates constructing a factory; estimated cost, $100,000.

Minneapolis, Minn.—Plans are being prepared by Long, Lamoreaux & Long, Archs., 830 Hennepin Ave., for the construction of a three-story, 97x112-ft. warehouse on Third St. and 11th Ave., for S. R. Sykes.

F. D. Knoblauch plans the construction of a one-story and basement, 50x150-ft. garage, at 1112 Harmon Pl. Estimated cost, $20,000.

St. Paul, Minn.—Plans have been prepared and are being considered by G. S. Loftus, 2401 Grand Ave., Sales Mgr. for the St. Paul Grain Exchange, for the construction of a $200,000 terminal grain elevator.

The Citizens Fuel Co., 8 West Fourth St., plans the construction of an ice plant on St. Anthony Hill. Estimated cost, $100,000.

Great Falls, Mont.—The Amalgamated Copper Co. plans the construction of an oil refinery, estimated to cost $1,000,000. J. D. Ryan is Pres.

Galveston, Tex.—Plans are being prepared for the construction of the superstructure of the 1,000,000-bu. concrete fireproof grain elevator for the Southern Pacific Terminal Co., a subsidiary of the Southern Pacific Co. A. McDonald, Supt. of Bridges & Bldgs., will supervise the foundation work. The grain elevator was recently damaged by fire with a loss of $1,000,000.

†Nacogdoches, Tex.—The contract for the construction of a feed mill, grain elevator and warehouse for the Nacogdoches Elevator Co. has been awarded to PARRISH BROS. Estimated cost, $20,000.

Trinity, Tex.—The Trinity Ice Co., recently destroyed by fire with a loss of $17,000, plans rebuilding at Trinity.

Cushing, Okla.—The Chelsea Refining Co., Chelsea, contemplates the construction of a refinery with a capacity of 3500 lbs. of oil.

Sapulpa, Okla.—Plans have been prepared by the Tait & Nordmeyer Engineering Co., St. Louis, Mo., for the construction of a 45x45x40-ft. ice-storage plant for the Sapulpa Ice Co. The capacity of the plant will be 1500 tons per day.

Woodward, Okla.—The Woodward Cotton Co. plans the construction of a flour mill with a capacity of 50 bbl. and a grain elevator with 20,000 bu. capacity.

Yale, Okla.—The Twin State Oil Refining Co. plans the construction of an oil refinery with a capacity of 2000 bbl. per day.

Seattle, Wash.—Plans are being prepared by the engineer of the Port Commission for the construction of the storage building, a $60,000 ice machine plant, an office building and a $35,000 refrigeration plant.

Portland, Ore.—The Stetler Box Factory contemplates the construction of a three-story building on 10th and Glisan St. Estimated cost, $60,000.

Alameda, Calif.—The Safety Mfg. Co. plans the construction of a $70,000 factory at the foot of Webster St. J. S. Slade is interested.

San Francisco, Calif.—The Western Sugar Refining Co. is planning the construction of a refinery at 23d and Louisiana St., estimated to cost $500,000. W. H. Hannam, 60 California St., is Secy.

San Francisco, Calif.—The Moody Estate Co., and the H. H. Larsen & Bro. will construct a two-story warehouse on Bluxome St. Estimated cost, $32,000.

FEDERAL GOVERNMENT WORK

Storehouse—Fort H. G. Wright (New London, Conn., post office), N. Y.—Bids will be received by the Constructing Quartermaster, until 10 a.m., Jan. 21, for constructing a concrete storehouse.

★**Dredging**—New York, N. Y.—Bids will be received by Col. W. M. Black, Army Bldg., 39 Whitehall St., New York, until noon, Jan. 22, for dredging in Hudson River Channel, New York.

Repairs to Post Office—Niagara Falls, N. Y.—Bids will be received by James Hulls, Custodian, until Jan. 20, for making repairs to the post office.

★✚**Dredging**—New Jersey—The contract for dredging in the Passaic River, N. J., has been awarded to JOHN A. SEELY, 30 Church St., New York, N. Y. Noted Dec. 3 and Dec. 17.

✚**Building**—Washington, D. C.—The contract for the construction of repair shop for the water department, has been awarded to the MELTON CONSTRUCTION CO., Washington, D. C., at $18,100. Noted Dec. 24.

✚**Road**—Aiken, S. C.—The contract for constructing a portion of the South Carolina Post Road in Aiken County, has been awarded to DYCHES & HOLLY, Aiken, S. C., at $11,666. Other bids were: J. Davis Powell, Columbia, S. C., $14,457; J. T. Plott, Greensboro, N. C., $14,540; C. C. Jordan, Lincolnton, N. C., $14,842; W. A. Foil, Concord, N. C., $16,678; Goodrich & Son, Anniston, Ala., $16,442; Simons-Mayrant Co., Charleston, S. C., $16,734; Cook & Rawlison, Selma, Ala., $16,736; C. L. Warren, Wellington, Ohio, $19,130; E. R. Gibson, Knoxville, Tenn., $19,237; Wright-Johnstone Co., Lincolnton, N. C., $19,526; Hening & Hagedron, Germantown, N. C., $19,556; H. H. Hinton, Athens, Ga., $19,722; H. B. Heppendeitzel Co., Macon, Ga., $21,642; C. E. Teagues, Columbia, S. C., $23,485; Bette & Boice, Chestertown, Md., $24,984. Noted Dec. 10.

Marble—Atlanta, Ga.—Bids will be received by F. H. Duehay, Supt., of Prisons, Dept. of Justice, Washington, D. C., until 2 p.m., Jan. 22, for furnishing marble for the corridor floors of the administration building at Atlanta.

Post Office—Canton, Miss.—Bids were received as follows: For the construction of a post office at Canton, (a) limestone; (b) sandstone: Mayben & Fruechtel, Gadsden, Ala., (a) $38,467; (b) $40,775. Algernon Blair, Montgomery, Ala., (a) $39,475; (b) $40,000. J. L. Crouse, Greensboro, N. C., (a) $39,778; (b) $40,778. George W. Stiles Construction Co., Chicago, Ill., (a) $40,927. W. H. Fissell & Co., New York, (a) $40,300; (b) $40,220. Standard Construction Co., Meridian, Miss., (a) $49,014; (b) $49,014. C. O. Eure, Hattiesburg, Miss., (a) $52,216; (b) $52,666. Noted Nov. 12.

Lock and Dam—Maysville, Ky.—Bids will soon be received by Lieut.-Col. H. Jervey, Custom House, Cincinnati, Ohio, for the construction of lock and dam No. 23, near Maysville. The estimated cost is $1,100,000. Plans and specifications have been completed.

Post Office—Ishpeming, Mich.—Bids were received as follows, for the construction of a post office at Ishpeming, (a) limestone; (b) sandstone: James Devault, Canton, Ohio, (a) $55,447; (b) $56,447. Frank L. Johnson & Co., Duluth, Minn., (a) $57,496; (b) $59,046. General Construction Co., Milwaukee, Wis., (a) $57,630; (b) $59,230. George W. Stiles Construction Co., Chicago, Ill., (a) $57,683. Westchester Engineering Co., White Plains, N. Y., (a) $57,700; (b) $59,700. Louis E. Chaussee, Negaunee, Mich., (a) $57,700; (b) $56,235. J. S. Wahlman, Ishpeming, Mich., (a) $70,000; (b) $71,200. Noted Dec. 19.

✚**Post Office**—Petoskey, Mich.—The contract for completing the post office has been awarded to JAMES B. FORMAN, Alpena, Mich., at $21,489. This contract was originally awarded to Richard Collins, Alpena, Mich., at $57,468.

Piers—Browning, Mont.—Bids will be received at the office of the U. S. Reclamation Service, Browning, until 2 p.m., Jan. 20, for constructing concrete piers for supporting the steel pressure pipes at the Hall's Coulee Crossing of the St. Mary Canal, St. Mary Storage Unit, Milk River project, Mont. The work involves about 250 cu.yd. of concrete and 1000 cu.yd. of excavation and backfilling and is situated in the Blackfeet Indian Reservation, about 35 miles northwest of Browning. H. N. Savage is Superv. Engr.

Building Supplies—Fort Reno (El Reno post office), Okla.—Bids will be received by Capt. W. S. Valentine, Fort Reno, until noon, Jan. 18, for furnishing lumber and hardware, required for constructing the riding hall.

✚**Sewer System**—Lawton, Okla.—The Secretary of the Department of Interior has awarded the contract for constructing a storm water sewer system for the north addition, to MAYFIELD & SHAW, Fort Bliss, Tex., at $27,308. Noted Oct. 22 and Nov. 19.

✚**Structures**—Glendale, Ariz.—The contract for constructing structures on the Arizona Canal, Salt River Project, has been awarded to MARTIN & GILLIS, Phœnix, Ariz., at $6918. Noted July 16 and Sept. 24.

Repairs to Vessel—Seattle, Wash.—Bids will be received by until noon, Jan. 11, for making repairs to the hull, boiler and machinery of the S. S. Patterson.

MISCELLANEOUS

Elimination of Grade Crossing—South Framingham, Mass.—Plans for the elimination of grade crossings are being prepared by Jay, Spofford & Thorndike, Engrs., 308 Boylston St., Boston.

Barge Canal Work—Albany, N. Y.—The lowest bid received by Duncan W. Peck, State Supt. Pub. Wks., for contract C-2, clearing the site at Seneca Falls, was that of the Levenson Wrecking Co., Hoboken, N. J., at $2675, this amount to be paid to the state. The following bids were received on the same date for Contract No. 13, for constructing a guard lock, highway bridge and cut-off dam at Schuylerville: Lou B. Cleveland, Watertown, $42,742; The Johnson-Gifford Co., New York, $57,992; Holloran Bros., Elmira, $56,264; Barrally & Ingersoll, Rochester, $52,472; Parker & Beebe, Waterford, $51,934; Flood & Van Wirt Co., Hudson Falls, $53,963; Leary & Morrison Co., Rochester, $57,733; Eastover Construction Co., Inc., Utica, $54,815; Callahan & Prescott, Inc., Albany, $52,366; George Holler, Albany, $50,311; Champlain Engineering & Construction Corporation, Saratoga, $50,731; W. F. Shields, Albany, $48,560; Scott Bros., Rome, $51,203; Chesley, Earl & Heimbach, Inc., Buffalo, $60,627; Holler & Shepard, Rochester, $55,087; Gruner & Hallenbeck, Harriman, $48,239; Walsh Construction Co., Davenport, Iowa, $56,203. Noted Dec. 3.

Police Signal System—Buffalo, N. Y.—Bids will be received until Jan. 5, by Frank J. Tanner, Clk. of Police Commission, for furnishing and installing police patrol signal flashlight system in three precincts.

Stable and Section House—New York, N. Y.—(Borough of Queens)—All bids received on Dec. 22 for the construction of a stable and section house in connection with the destructor plant at Ridgewood, have been rejected due to the supply of specifications and blank forms being exhausted before all the bidders could be furnished with them. The work will be readvertised in the near future. Noted Dec. 17.

Riprap—New York, N. Y.—(Borough of Manhattan)—(Official)—Bids will be received until Jan. 4, by R. A. C. Smith, Comr. Docks and Ferries, for furnishing, delivering and placing about 50,000 cu.yd. of riprap. Security required, $14,000.

Elevated Railway Work—Belvidere, N. J.—According to press reports, the Pennsylvania R.R. plans to elevate its tracks from Coalport to a point near Prospect St.

Motor Fire Apparatus—Haddon Heights, N. J.—Bids will be received until 8 p.m., Jan. 5, by E. C. Ridgway, Borough Clk., for furnishing and delivering one combination hose and chemical wagon; one tractor attached to steam fire engine; one motor tractor for fire engine and one triple combination pump, chemical and hose wagon.

Motor Police Patrols—Jersey City, N. J.—(Official)—Bids will be received until 2 p.m., Jan. 7, by the Board of Commissioners for two or more automobile patrol wagons. M. I. Fagan is City Clk.

Crib Work—Long Branch, N. J.—The City Commissioners will soon advertise for bids for cribbing along the ocean front, repairing the recent storm damages. The work is estimated to cost about $28,000. J. Wesley Seaman is City Engr.

Broken Stone—Mount Holly, N. J.—Bids will be received until Jan. 1, by the Board of Chosen Freeholders, for furnishing broken stone to the county for the year 1915. Samples of 1½-in. and ¾-in. stone must accompany bid; and prices f.o.b. at quarry location. James Logan is County Engr.

Dock Bonds—Newark, N. J.—The city, Dec. 21, sold $900,000 worth of dock bonds. Tyler Parmly is City Controller.

Lock—Paterson, N. J.—The Dundee Land & Power Co. has submitted a plan to the city for the construction of a lock through the present Dundee dam.

Bulkhead and Boardwalk—Sea Isle City, N. J.—The city is considering replacing that portion of the bulkhead and boardwalk destroyed by the recent storm. The estimated cost is $21,000.

Breakwater and Boathouses—Baltimore, Md.—H. Kent McCay, City Engr., Baltimore, is preparing tentative plans for the proposed shore improvements at Fort McHenry. These include the construction of a breakwater around the park, sand bottom bathing beach, quarters for the boat clubs of the city and boathouses along the shore line for the public. Oscar F. Lackey, Engr., Harbor Bd., will be in charge of the breakwater construction. Noted Nov. 26 and Dec. 10.

✚**Drainage**—Concord, N. C.—Cabarrus County Drainage District No. 3 has awarded the contract for constructing 5½ miles of drainage canal to THOMPSON & MOSELEY, Greensboro, N. C., at $11,800. Noted Dec. 17.

✚**Drainage**—Salisbury, N. C.—The Commissioners of Back Creek and Kerr Creek drainage districts have awarded contracts for draining Back Creek and Kerr Creek, to MARK T. MOORE, at $15,366 and $9287, respectively. G. M. Miller, Salisbury, is Engr. and Supt. Noted Nov. 19.

Dock and Harbor Improvements—Miami, Fla.—The United States government engineers, in charge of the South Atlantic

coast, have approved the plans of Isham Randolph for the municipal dock and harbor work. This plan is known as Randolph Plan No. 5. Noted Sept. 24, Dec. 10.

Drain—Parish, Fla.—The Manatee County Commissioners has authorized the construction of the Gamble Drain. It will drain about 20,000 acres of land and is estimated to cost $90,000.

Drainage—Gonzales, La.—The Commissioners of the New River Drainage District have approved the plans of Daney & Waddill, Engrs., and will receive bids until Feb. 4, for the construction of the proposed drainage system, requiring about 2,000,000 cu.yd. of excavation.

Drainage—Lake Charles, La.—The North American Land & Timber Co. has purchased 7240 acres in this parish. A drainage system will be constructed and roads built. When the improvements are completed, the property will be sold for farmsteads.

Canal—New Orleans, La.—The Dock Board has instructed its engineers to prepare plans and specifications for the construction of a commercial canal from the Mississippi to Lake Pontchartrain. It will be ten miles in length.

+Arena—New Orleans, La.—The New Orleans Auditorium & Athletic Association has awarded the contract for the construction of a 215-ft. diameter arena to A. RUPVICH, at $30,000. W. R. Burk, 840 Gravier St., is Arch. Noted Dec. 24.

+Ditch—Greenville, Ky.—According to press reports the Board of Drainage Commissioners has awarded the contract for constructing a 3⅛-mile ditch, requiring 55,000 cu.yd. of excavation, to EWING & BROKENBROUGH, Lafayette, Ind., at 11.15c. per cu.yd.

Ditch—Bucyrus, Ohio—L. P. Michaelis, County Surv., will let contracts about Feb. 1 for the construction of Trustee Ditch, estimated cost, $1560; and the Mud Run Ditch, requiring 150,000 cu.yd. of excavation, estimated to cost $56,000.

Shelter House and Comfort Station—Cleveland, Ohio—Plans and specifications are being prepared by Frank D. Skeel, Arch., Vickers Bldg., Cleveland, for a shelter house, comfort station and store house to be constructed by the City of Cleveland under the viaduct at Euclid Ave. and 55th St. The buildings will be constructed of reinforced concrete.

Mausoleum and Crematory—Cleveland, Ohio—The Cleveland Cemetery Association, 860 Leader News Bldg., has purchased a 100-acre site on North Ridge Rd. for a cemetery. A granite and marble mausoleum and a crematory will be constructed in the spring at an estimated cost of $175,000. H. F. Whedon is Pres.

Fire Hydrants—Cleveland, Ohio—(Official)—The following bids were received Dec. 18 by the Department of Public Utilities Division of Water for furnishing 1000 4-in., and 100 6-in. fire hydrants: R. D. Woods & Co., 400 Chestnut St., Philadelphia, Penn., at $25,545; The Kennedy Valve Mfg. Co., Elmira, N. Y., $26,384; Roe Stephens Mfg. Co., Detroit, Mich., $27,200.

Retaining Wall—Tiffin, Ohio—According to press reports the City Council has voted that the City Solicitor be instructed to advertise for bids for the construction of a retaining wall on the east side of the river. The total cost of the work is estimated at $150,000. The present plans call for its construction by sections as the funds are available.

Ore Dock Repairs—Ashland, Wis.—According to local press reports the Minneapolis, St. Paul & Sault Ste. Marie Ry. plans to spend $25,000 in making repairs to its ore docks at Ashland.

Grandstand—Madison, Wis.—C. R. Van Hise, Pres., University of Wisconsin, has recommended to the Board of Regents that a grandstand be erected having a seating capacity of 10,000. The estimated cost is $53,500.

+Grading—Milwaukee, Wis.—The County Commissioners have awarded the contract for leveling the grounds at the House of Correction, Grantville, to EDWARD RADTKE, Milwaukee, at 15.5c. per cu.yd.

Physical Training Building—Oshkosh, Wis.—Bids will be received until Jan. 1, by William Kittle, Secy., State Bd. of Normal Regents, Madison, for the construction of a three-story, 44x146-ft. physical training building at the State Normal School. The estimated cost is $100,000. Van Ryn & De Gelleke, Archs., 725 Caswell Bldg., Milwaukee, prepared the plans.

Ditch—Stillwater, Minn.—All bids received on Dec. 19 for the construction of Judicial Ditch No. 4 have been rejected, being higher than the engineer's estimate. N. A. Nelson, County Audr., will advertise for new bids. H. R. Ridge is Engr. Noted Dec. 10.

Motor Fire Apparatus—Sioux Falls, S. D.—The Seagrave Co., Columbus, Ohio, and James Boyd & Bros., Inc., Philadelphia, both at $10,000, were the low bidders for furnishing the city with a 75-ft. automobile fire truck.

Drainage—Wynne, Ark.—All bids received Dec. 7, by W. H. Newsom, Engr., Drainage District No. 2, Crittenden County, have been rejected. The lowest bid received was $430,000. New bids will be asked for shortly. Noted Nov. 26, Dec. 24.

+Grading—Dallas, Tex.—The Dallas Baseball Club has awarded the contract for grading its new baseball park to the CULLUM-BAVOUSETTE CO., Dallas.

River Diversion—Rocky Ford, Colo.—The County Commissioners plan to divert the Arkansas River at a point west of the Ordway road bridge. The plan, as it now stands, calls for the excavation of a straightaway channel, eliminating the former elbow.

Filling—Aberdeen, Wash.—Press reports state that citizens of North Aberdeen have voted to fill the city's tide flats at an estimated cost of $65,000.

+Metal Flume—North Yakima, Wash.—The Union Gap Irrigation District has awarded the contract to the VALLEY CONSTRUCTION CO. for installing three miles of metal flume, replacing a woden flume.

+Filling—Tacoma, Wash.—The Union Pacific R.R. has awarded the contract for filling in the abandoned tunnel at 25th St. and Jefferson Ave. to GRANT, SMITH & CO., at $50,000.

Waterway—Tacoma, Wash.—At the election held on Dec. 12, the citizens voted in favor of the plans for the construction of the Hylebos Creek Waterway, 2½ miles in length from deep water to Julia's Gulch. The estimated cost is $350,000. Noted July 9, Oct. 8, Nov. 19, Dec. 17.

+Motor Fire Apparatus—Portland, Ore.—The Council has awarded the following contracts for furnishing the city with motor fire apparatus: For one auto-service truck, SEAGRAVE FIRE APPARATUS CO., Columbus, Ohio, at $6468; for one combination chemical and hose wagon, WHITE AUTOMOBILE CO., Cleveland, at $5900.

+Elevators—Portland, Ore.—The Meier & Frank department store has awarded a contract to the OTIS ELEVATOR CO., at $200,000, for the installation of ten passenger and three service elevators.

Dredging—Longbeach, Calif.—The lowest bid received for dredging Longbeach harbor to an average depth of 18 ft., was that of the Los Angeles Dredging Co., at $24,000, lump sum, or 24c. per cu.yd. The next lowest bid was that of the Standard American Dredging Co., at $27,000, or 38.5 per cu.yd. Noted Oct. 22, Dec. 24.

+Oil Pumping Stations—San Francisco, Calif.—The Valley Pipe Line Co. has awarded a contract for the construction of 11 pumping stations along its line from Coalinga to Martinez, to the COLUMBIA STEEL WORKS, Pittsburg, Calif.

Fire Alarm System—Welland, Ont.—Bids soon will be received for the installation of a complete automatic fire alarm system. Clarence W. Webber is interested.

Crushing Machinery and Locomotives—Winnipeg, Man.—(Official)—Bids will be received until noon, Jan. 18, by S. H. Reynolds, Chn. of Comrs., 901 Boyd Bldg., for furnishing gravel-pit excavation, screening, elevating and crushing machinery; also for locomotives and cars for pit and railway service.

Wharf Extension—New Westminister, B. C.—The Canadian Pacific R.R., it is reported, will soon make an appropriation for the extension of its wharf out to the harbor line.

BUILDINGS

New London, Conn.—Bids are being received by Dudley St. Clair Donnelly for the construction of a three-story brick Y. M. C. A. building. Estimated cost, $100,000. G. S. Palmer, F. W. Mercer, and E. D. Steele are members of the building committee.

Dunkirk, N. Y.—Plans are being prepared for a theater on Central Ave. Estimated cost $50,000. James L. Drohen is Mgr.

Mohawk, N. Y.—Bids will be received until Jan. 30, by Walter Frank, Arch., Clarendon Bldg., Utica, N. Y., for constructing a two-story and basement 70x100-ft. school. Estimated cost, $40,000.

New York, N. Y.—(Borough of Brooklyn)—Plans are being prepared by Shampan & Shampan, 772 Broadway, Brooklyn, for the construction of an apartment house at South Second and Berry St. Estimated cost, $48,000.

New York, N. Y.—(Borough of Brooklyn)—Preliminary arrangements are being made for the construction of a temple 100x100 ft. on Lincoln Pl. and Rochester Ave., for the Petach Tikvah congregation. Estimated cost, $100,000. Edward M. Adelsohn is Arch. W. B. Roth 1133 Eastern Parkway, is Pres. of the congregation.

+New York, N. Y.—(Borough of Brooklyn)—The contract for the construction of a five-story nurses home on Sixth St., for the Methodist Episcopal Hospital has been awarded to THE WILLIAM KENNEDY CONSTRUCTION CO., 215 Montague St., Brooklyn, N. Y. Estimated cost, $150,000. Noted Dec. 10.

(Borough of Bronx)—The Board of Supervisors of Westchester County appointed a committee to select a site for a county jail to cost $400,000. E. P. Barrett is Chn. of Bd.

(Borough of Queens)—Low bids for the construction of the nurses' home and two ward buildings at the Long Island almhouse have been received as follows: Manus J. Fish, general contract, $131,130; C. H. Sanborn, heating, $16,650; Carlisle Connor Co., electrical work, $10,900.

(Borough of Richmond)—Plans have been completed by Harry W. Pelcher, National Bank Bldg., Port Richmond, for the construction of a five-story 45x125-ft. hotel at Jay and De Kalb St., New Brighton. Estimated cost, $55,000.

+(Borough of Richmond)—Chas. J. McCormack, has awarded a contract to JOHN H. PARKER CO., 315 Fourth Ave., for the construction of a four-story, 150x150-ft. court house in De Kalb, Wall, Stuyvesant, Jay and Hamilton St. Estimated cost, $237,985. Carrere & Hastings, 225 Fifth Ave. are Archs. Noted Nov. 26.

+Olean, N. Y.—The contract for the construction of a one-story and basement 65x178-ft., church has been awarded to WILLIAM STOKES & SONS. Estimated cost, $100,000. E. N. Uhlrich, 19 Euclid Bldg., Cleveland, Ohio, is Arch.

Watertown, N. Y.—The Board of Education contemplates constructing a $65,000 school on Arsenal St. Frank S. Tisdale is Pres. of Bd.

Glen Ridge, N. J.—The Board of Education contemplates constructing an addition to the high school to cost $60,000.

Jersey City, N. J.—Bids will be received until Jan. 1, by the Fairmont Amusement Co., Spangarn Bldg. for the construction of a one-story and three-story 67x99-ft., 72x153-ft. theater. Estimated cost $100,000. Walter Hanken, 28 Delview Ave., Trenton, N. J. is Arch.

+Newark, N. J.—The Public Service Ry. Co. has awarded a contract to the HEDDEN CONSTRUCTION CO., 763 Broad St., for the construction of a railway terminal at Park Pl. Estimated cost, $1,980,000.

Plans have been prepared by Guilbert & Betille, Archs., and approved by the Board of Education for the construction of the McKinley School. Estimated cost, $102,000.

Princeton, N. J.—The Trustees of Princeton University contemplate constructing a $500,000 building to be used as a dining hall.

Ridgefield Park, N. J.—Bids will be received by the John J. Hearn Construction Co., 69 West 46th St., New York, N. Y., for the construction of a building for the St. Francis R. C. Church. Estimated cost, $100,000. F. J. Schwartz, Paterson, N. J., is Arch.

Carbondale, Penn.—Plans are being prepared for the construction of a two-story high school to cost $100,000. E. H. Davis, Connell Bldg., Scranton, is Arch.

New Castle, Penn.—Plans are being prepared for the construction of a three-story 60x100-ft. Masonic Temple. Estimated cost, $45,000. A. L. Thayer, Witherspoon Bldg., Philadelphia, Penn., is Arch.

Scranton, Penn.—Bids will be received by the Young Men's Hebrew Assoc. for constructing a three-story, 60x125-ft. building to cost $50,000. Albert J. Ward, Scranton, Penn. is Arch. Noted Dec. 17.

+Waynesboro, Penn.—The contract for the construction of the Y. M. C. A. building has been awarded to A. R. WARNER, Waynesboro, at $50,699.

Wilmington, Del.—Plans are being prepared by Wallace E. Hance, Arch., for the construction of the Avenue Theater. Estimated cost, $50,000. Mrs. Lulu C. Baldt, Philadelphia, is interested.

Norfolk, Va.—Plans have been prepared by Rossell Edward Mitchell and F. Nelson Wilcox, Dickson Bldg., for the construction of an 11-story, 87x120-ft. apartment house at Dundaff St. and Fairfax Ave. for the Plaza Realty Corporation, Virginia National Bank Bldg. Estimated cost, $275,000.

Richmond, Va.—Bids will be received until Jan. 4 by the Police Commissioners for the construction of a station house, 60x40 ft., to be located at Smith and Marshall St. Estimated cost, $45,000. Carneal & Johnston are Archs.

Parkersburg, W. Va.—Plans have been prepared by Dennison, Hirons & Darbeyshire, Archs., 475 Fifth Ave., New York, N. Y., for the construction of a building for the Second National Bank. Estimated cost, $50,000.

Savannah, Ga.—H. W. Witcover is preparing plans for the construction of an auditorium to cost $200,000.

+Monroe, La.—(Official)—The contract for the construction of a temple for the Congregation of Bnai Israel has been awarded to FRANK MASLING, Monroe. Noted Nov. 26.

Nashville, Tenn.—Bids will be received by Frank H. Simpson, until Jan. 30, for the construction of a four-story building for the college of medicine at Vanderbilt University. Estimated cost, $300,000. Samuel Hannaford & Sons, Cincinnati, Ohio, are Archs.

Louisville, Ky.—Ward & Glossop, Archs., Paul Jones Bldg., are preparing plans for the construction of a two-story building at Fifth and Jefferson St. Estimated cost, $400,000. Arthur E. Mueller is interested.

Cleveland, Ohio—The Al Koran Shrine Temple Co. will construct for the Cleveland Shriners a group of buildings on Euclid Ave. and East 46th St. The estimated cost is $3,000,000.

Hamilton, Ohio—The city of Hamilton will issue $200,000 in bonds for the construction of a city hall.

Grand Rapids, Mich.—Bids will be received about Jan. 1 for the construction of a one-story building for the First Methodist Church. Estimated cost, $160,000. Noted Nov. 12.

Chippewa Falls, Wis.—Raeuber & Mchmer, Archs., 826 South Eighth St., Manitowoc, have been selected by the Board of County Supervisors to prepare plans for the construction of a two-story brick and stone addition to the Chippewa County Court House. Estimated cost $50,000.

Cudahy, Wis.—Bids are being received by the Board of Education for the construction of a three-story and basement 122x133-ft. school. Estimated cost, $50,000. Robert A. Messmer & Bros., Majestic Bldg., Milwaukee, are Archs.

+Madison, Wis.—Contracts for the construction of the north wing of the capitol building have been awarded as follows: NORTHWESTERN MARBLE & TILE CO., Minneapolis, Minn., stone and marble, $133,870; McNULTY BROS., Chicago, Ill., masonry, $97,200; RIESEN & RIESEN, University Bldg., Milwaukee, carpentry, $36,473; DECORATOR STAINED GLASS CO., Madison, lead glass, $2240; FLOUR CITY ORNAMENTAL IRON WORKS CO., Minneapolis, Minn., ornamental iron, $36,350; MUELLER CO., Milwaukee, heating and ventilating, $61,400; C. J. FOX, Milwaukee, plumbing, $17,900; PAUL F. HARLOFF CO., Madison, electrical work, $23,700. Noted Dec. 25, 1913, Jan. 8 and Feb. 19, 1914.

+The contract for the construction of the physics building for the University of Wisconsin has been awarded to the WISCONSIN CONSTRUCTION CO. Estimated cost, $180,775. Noted Dec. 3.

+Marinette, Wis.—Contracts for the construction of the $125,000 high school have been awarded to BAILEY MARSH & CO., Minneapolis, Minn., general contract; GENERAL HEATING & VENTILATING CO., Milwaukee, heating and ventilating. Noted Aug. 27 and Oct. 8.

Milwaukee, Wis.—Plans have been prepared by A. C. Eschweiler, Arch., 141 Wisconsin St., for the construction of a $200,000 Main exchange building and a $45,000 Mitchell exchange building for the Wisconsin Telephone Co., 185 Fifth St.

Montello, Wis.—The Board of County Commissioners will submit at the April election a proposal to appropriate $40,000 for the court house and jail at Montello. William Guderjahn is County Clk.

Oshkosh, Wis.—See item under "Miscellaneous," Physical Training Building.

Oshkosh, Wis.—Bids will soon be received by the Secretary of the Board of Education for the construction of the three-story and basement, 78x144-ft. high school. Estimated cost, $165,000. Noted Oct. 22.

Union Grove, Wis.—Bids will soon be received by M. J. Tappins, Secy. of the Home for Feeble-Minded and Epileptics, Capitol Bldg., Madison, for the construction of the first unit of a group of buildings to cost $250,000. It includes a power plant, laundry, dormitory, shop and school. Noted Oct. 29.

Duluth, Minn.—Bids will be received about Feb. 1 for the construction of the Lincoln High School. F. G. German, American Exchange Bldg., is Arch.

Plans are being prepared by Kelly & Williams, Archs., 402 First National Bank Bldg., for the construction of an $110,000 armory, on London Rd. and 13th Ave. East.

Excelsior, Minn.—Plans are being prepared by Clifford T. McElroy and Leroy Kenport, Archs., 514 Essex Bldg., Minneapolis, for the construction of a $45,000 high school.

Glenwood, Minn.—Alban & Lockhart, Archs., Endicott Bldg., St. Paul, are preparing plans for the construction of a two-story and basement 73x116-ft. high school. Estimated cost, $50,000.

Hibbing, Minn.—The city of Hibbing plans the construction of a $75,000 court house. The architect has not been selected. D. D. Haley is City Recdr.

Minneapolis, Minn.—The Anderson & Nelson Construction Co. plans the construction of an 80x100-ft. apartment house at 821 First Ave. South. Estimated cost, $50,000.

Plans are being prepared by C. E. Bell, Arch., Security Bank Bldg., for the construction of a 12-story 50x88-ft. hotel on Second St. and Hennepin Ave. for the Union City Mission.

Bids will be received until 2 p.m., Jan. 7, by the State Board of Control, State Capitol Bldg., St. Paul, for the construction of the $200,000 Biology Building for the University of Minnesota. C. H. Johnston, 715 Capital Bank Bldg., St. Paul, is Arch. Noted Oct. 22.

St. Paul, Minn.—Plans are being prepared by A. H. Stem, Arch., 608 Endicott Bldg., for the construction of a ten-story building at Fourth and Cedar St. for the St. Paul Athletic Club. Estimated cost, $500,000. Noted Nov. 27, 1913, Sept. 3 and Dec. 24, 1914.

Atchison, Kan.—Bids will be received until Jan. 15 for the construction of the two-story Martin School. The estimated cost is $50,000. Sayler & Seddon, 606 Gumbel Bldg., are Archs.

Kansas City, Kan.—The Board of Administration will petition the next legislature to appropriate $250,000 for the construction of a six-story main hospital, a two-story free dispensary, and a one-story power house and laundry for the Bell Memorial Hospital and School of Medicine. Estimated cost, $500,000.

Havre, Mont.—Plans have been prepared by Frank Bossuat for the construction of a three-story court house, surmounted by a dome. Estimated cost, $125,000.

Kansas City, Mo.—The Security Realty Co. plans the construction of an eight-story hotel at Ninth, Main and Delaware St. Estimated cost, $200,000. McKechnie & Trask are Archs.

St. Louis, Mo.—Plans are being prepared by A. Meyer, Arch., 705 Olive St., for the construction of a one-story and basement building at Fair and Margarretta Ave., for the Independent Evangelical Protestant Church. Estimated cost, $45,000.

+St. Louis, Mo.—The contract for the construction of a nine story building on Fourth and Washington St. for the Missouri Athletic Association has been awarded to JAMES H. BRIGHT CONTRACTING & BUILDING CO. Estimated cost, $118,985. Noted July 30 and Aug. 27.

Helena, Ark.—Plans are being prepared by the building committee of the Temple Betz Eljel for the construction of a $50,000 building.

+Canyon, Tex.—(Official)—The contract for the construction of a three-story and basement State Normal School has been awarded to the GROSS CONSTRUCTION CO., Waco. George A. Endress, Austin, is Arch.

San Antonio, Tex.—Plans have been prepared by Chapman & Murphy, Archs., for the remodeling and construction of two additional stories to the building at 213-17 St. Mary's St., for Jourdan Campbell.

Oklahoma City, Okla.—(Official)—The contract for the construction of the 143x424-ft. state capitol for the State of Oklahoma will be awarded about Jan. 15. The estimated cost is $1,500,000. Noted Apr. 23 and Nov. 26.

Okanogan, Wash.—(Official)—Bids will be received until Jan. 6 for the construction of a three-story, 55x82-ft. court house for Okanogan County. George H. Keith is Arch. Noted Dec 10.

Spokane, Wash.—Bids will soon be received by the County Commissioners of Spokane County for the construction of a $40,000 tuberculosis sanitarium. A. Rigg is Arch.

El Centro, Calif.—The city of El Centro contemplates constructing a $40,000 city hall on State St. A. W. Swanson is Mayor.

+Fresno, Calif.—The Board of Education has awarded contracts for the construction of the Webster School on Carl and Augusta St. to JAMES L. DALY, at $52,700; and the Longfellow School to the EVANS CONTRACTING CO., at $85,250.

+San Francisco, Calif.—The contract for the construction of fire-proof partitions in the Fine Arts Building for the Panama-Pacific International Exposition Co. has been awarded to STRETHLOW, FREESE & PETERSON. Estimated cost, $60,070.

+The contract for the construction of the exhibition building on the Panama-Pacific International Exposition grounds for the Southern Pacific Co. has been awarded to the DUNNAVANT-HOUGHTON-VAN SANT CO., INC. Estimated cost, $56,500.

Weyburn, Sask.—Plans are being prepared for the construction of a $125,000 court house and registry office at Weyburn.

Old Hickory is the new name of an old wagon. This name will be applied to the dump wagons made by the Kentucky Wagon Mfg. Co., Louisville, Ky. Their former trade name was "Kentucky."

The Weber Chimney Co. announces that the New York office has been changed from 95 Liberty St. to 30 Church St., Hudson Terminal. This office will be in charge of Halbert T. Hill, Inc.

Engineering News

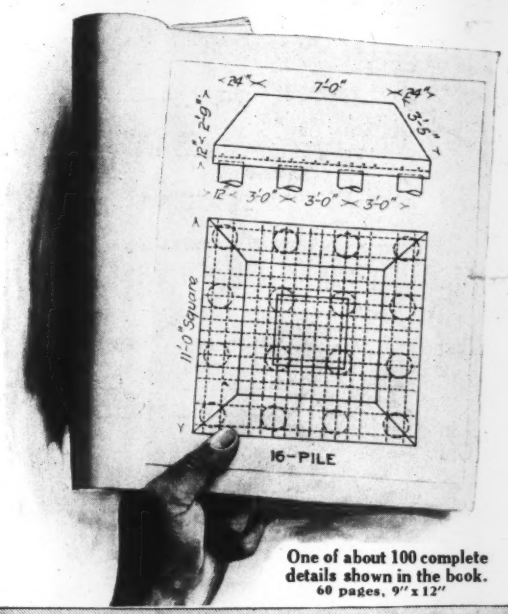
Issued Every Thursday
Hill Publishing Company

NEW YORK, DECEMBER 31, 1914

Price, 15 Cents. $5 Yearly
To Canada, $7. Foreign, $9

Engineering Library

JAN 2 1915



One of about 100 complete details shown in the book.
60 pages, 9" x 12"

Concrete Pile Standards

By Hunley Abbott

A Book of Drawings, Specifications and Other Data of Value to Engineers, Architects and Designers.

Prepared by an Engineer who has Designed the Foundations of Modern Office Buildings, Warehouses, Bridges, Gas Holders and Other Structures.

50 cents

This is not a book of general descriptions and photographs but of concise information and completely detailed drawings. It treats of practically every step in the design of any type of concrete pile foundation and is believed to be the most USABLE book so far written on this subject.

Contains

I. Standard Details of Reinforced Concrete Pile Caps; full explanation of their design and large scale dimensioned drawings of all the standard and many special cases with estimated quantities and bills of material.

II. Standard Specifications for all types of Concrete Piles.

III. Concrete vs. Wooden Piles; a comparison of costs under various soil conditions.

IV. The theory of Pile Support, with actual values for friction and bearing quoted from recognized authorities.

V. Detailed description and drawing showing the Method of Testing a Concrete Pile.

This book should be on your desk or your drafting table. Write today enclosing 50 cents (in stamps if you wish). Postage Paid.

22 Thames St. **Berrian & Douglas** **New York City**

1914 REVIEW

LACKAWANNA STEEL SHEET PILING

During the past year this space has been filled with useful information about many large undertakings where Lackawanna Steel Sheet Piling was gratifyingly successful.

Although none of these were on such an immense scale as the raising of the Maine and the building of the Black Rock Ship Lock, where the Lackawanna product figured prominently, the following are worthy of another mention:

GALVESTON CAUSEWAY—Where Lackawanna Steel Sheet Piling succeeded after other methods failed. After five successive installations this sheet piling was still good for reuse.

92ND ST. BRIDGE, CHICAGO—One of the largest single-wall braced cofferdams ever constructed was built here to facilitate construction of an abutment.

TUNKHANNOCK VIADUCT—Lackawanna Steel Sheet Piling was used here exclusively in cofferdams for pier footings of the highest concrete viaduct on record. One open cofferdam was 90 feet deep.

BOSTON SUBWAY—Lackawanna Steel Sheet Piling was used in the vicinity of Copley Square, the Public Library, and the new Old South Church in work of an unusually delicate nature.

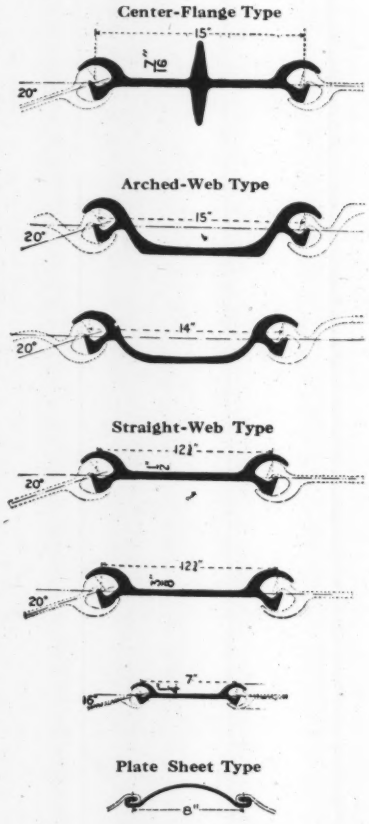
NEW YORK CITY SUBWAYS—Lackawanna Steel Sheet Piling was used here both to hold up buildings on Lexington Ave. and in joining land ends with tubes submerged under the Harlem River.

CHICAGO AVE. BRIDGE—Lackawanna Steel Sheet Piling was used here in 40-foot lengths for two 86 by 56-foot single wall cofferdams in building the abutment foundations.

CAPE FEAR RIVER—A 313x84½-foot cofferdam has been driven as the first of two large U. S. Government installations here.

We have also described twelve cofferdams; seven foundation walls for piers, bridges, etc.; two retaining walls; a trench; improvements in the design of piling sections; new catalogs of interest to engineers; and in other ways have made our weekly page of value to those who may at some time need sheet piling.

Our 1915 ads. will describe, among others, very large and unprecedented installations that are aiding in some of the most important construction work now under way. You will find it to your interest to keep in touch with these projects by continuing to read every one of our advertisements carefully.



Begin the new year right by sending for our Steel Sheet Piling Bulletins.

LACKAWANNA STEEL COMPANY

General Sales Office and Works: Lackawanna, N. Y.

NEW YORK BOSTON BUFFALO PHILADELPHIA CLEVELAND CINCINNATI CHICAGO DETROIT ST. LOUIS ATLANTA SAN FRANCISCO MONTREAL

Licensees for the manufacture of Lackawanna Steel Sheet Piling:

For Great Britain and British Colonies in the Eastern Hemisphere, Cargo-Fleet-Iron Co., Ltd., Middlesborough, England. For France, Italy, Spain, French Colonies and Protectorates, Italian Colonies and Spanish Colonies in the Eastern Hemisphere: Cie Des Forges & Aciéries de la Marine et d'Homécourt, Paris, France. 187

Engineering News

CHARLES WHITING BAKER, *Editor*

Subscriptions payable in advance, $5.00 a year for 52 numbers, including postage in the United States, Mexico, Cuba, Porto Rico, Hawaii, or the Philippines, $7.00 in Canada.

Published Weekly By HILL PUBLISHING COMPANY

Tenth Avenue at Thirty Sixth Street, New York, N. Y.

JOHN A. HILL, Pres. ROB'T MCKEAN, Sec'y.

Cable Address: "ENGNEWS"

To foreign countries, including postage, $9.00 or its equivalent, 38 shillings: 38 marks: or 47 francs. Subscriptions for Great Britain, Europe or British Colonies may be sent to London Office, 6 Bouverie St., London, E. C., England. Notice to change address should be written to the New York Office in every instance. Advertising copy should reach New York Office two weeks before date of issue. Entered at New York Postoffice as mail matter of the second class.

VOLUME 72 DECEMBER 31, 1914 NUMBER 27

CONTENTS

WITH PRINCIPAL ARTICLES SUMMARIZED

*Illustrated Article

*INFLUENCE OF RESERVOIR BOTTOMS ON STORED WATER: *Page* 1289

Shows that stripping reservoir bottoms of soil containing organic matter may not permanently prevent bad tastes and odors on account of suspended organic matter brought in by water to be stored; describes clearing swampy areas of Kensico reservoir and covering with soil excavated from nearby borrow pits; a large aerating fountain is also briefly described. 2000 w. 5 ill. Wilson Fitch Smith. ENGINEERING NEWS, Dec. 31, 1914.

*FROG GUARD RAILS OF SPECIAL DESIGN: *Page* 1292

Describes Morrison, Ajax and Morden guard rails. 700 w. 4 ill. ENGINEERING NEWS, Dec. 31, 1914.

*NEW YORK RAPID TRANSIT RAILWAY EXTENSIONS: *Page* 1294

Twelfth and last installment of serial article. Describes typical concrete plants throughout work and design and construction of the elevated concrete structure at Queens Boulevard. 2500 w. 6 ill. F. Lavis. ENGINEERING NEWS, Dec. 31, 1914.

*OCEAN STORMS AT SEABRIGHT, N. J.: *Page* 1298

Illustrates damage done to shore property by a recent northeast storm. 100 w. 2 ill. ENGINEERING NEWS, Dec. 31, 1914.

*WIDENING A BUSINESS STREET AT ST. PAUL, MINN.: *Page* 1299

Work in progress of an unusual character; moving back the building line 20 ft., all on one side of the street. 900 w. 1 ill. ENGINEERING NEWS, Dec. 31, 1914.

*CONSTRUCTION CAMP, ELEPHANT BUTTE, N. M.: *Page* 1300

Camp of U. S. Reclamation Service; hospital department; preventive measures; sanitary features; garbage and night-soil disposal and fly prevention. 3200 w. 5 ill. J. Dale Graham. ENGINEERING NEWS, Dec. 31, 1914.

*EXHIBIT OF MODERN STREET-CLEANING APPARATUS: REFUSE COLLECTION: *Page* 1304

Supplement of article and illustrations in "Engineering News" of Dec. 3, pp. 1139-1143. 300 w. 4 ill. ENGINEERING NEWS, Dec. 31, 1914.

PRELIMINARY REPORT ON EMSCHER TANKS AND KINDRED SEWAGE-CLARIFICATION PROCESSES: *Page* 1306

A condensation of a translation of a German report on various phases of Imhoff and other tank treatments. 2900 w. Prof. Dr. K. Thumm and Prof. Dr. Eng. C. Reichle. ENGINEERING NEWS, Dec. 31, 1914.

*REPAIRING AND RESURFACING BITUMINOUS PAVEMENTS: *Page* 1308

Cheap but effective method of repairing bituminous pavements with previously prepared material; resurfacing by a flush coat of cold oil. 2000 w. 2 ill. Samuel H. Lea. ENGINEERING NEWS, Dec. 31, 1914.

SNOW-REMOVAL PLAN FOR NEW YORK CITY: *Page* 1310

The regular street-cleaning force and emergency men will push snow through manholes into the sewers. Snow will be removed as it falls instead of waiting for it to accumulate. Novel features for raising emergency forces and for paying the men are to be tried. 1700 w. ENGINEERING NEWS, Dec. 31, 1914.

*FAILURE OF THE HIPPODROME ARCADE, YOUNGSTOWN, OHIO: *Page* 1326

Report of investigation of failure of two-story reinforced-concrete building during construction, Oct. 26. 3600 w. 5 ill. ENGINEERING NEWS, Dec. 31, 1914.

*EXAMPLE OF FIRE-RESISTANT WINDOWS AND STRUCTURE: *Page* 1331

Fire which destroys frame building does not injure adjoining building with concrete frame, wire-glass windows in steel sash. 2 ill. ENGINEERING NEWS, Dec. 31, 1914.

FIELD AND OFFICE:

*PORTABLE HOIST TOWERS FOR CONCRETING: *Page* 1312

Describes two applications: (1) Where the tower travels back and forth between mixer and work; (2) Where mixer and tower are mounted on separate flat-cars and moved about from point to point as desired. 900 w. 4 ill. ENGINEERING NEWS, Dec. 31, 1914.

*DIFFERENTIAL GAGE FOR VERY SMALL PRESSURE DIFFERENCES: *Page* 1314

Large glass tubes, colored carbon bisulphide, hook gages with vernier. 400 w. 1 ill. William Easby, Jr. ENGINEERING NEWS, Dec. 31, 1914.

*IRRIGATION FLUMES OF INGOT IRON: *Page* 1314

300 w. 1 ill. ENGINEERING NEWS, Dec. 31, 1914.

OUTLINE OF DATA TO BE OBTAINED FOR A REPORT ON THE FEASIBILITY OF ANY IRRIGATION PROJECT: *Page* 1315

Check lists of points to be covered in reporting on non-storage and on storage systems. 800 w. H. F. Robinson. ENGINEERING NEWS, Dec. 31, 1914.

*SMALL CATERPILLAR TRACTORS FOR MISCELLANEOUS HAULING: *Page* 1316

300 w. 2 ill. ENGINEERING NEWS, Dec. 31, 1914.

SOME OF THE HISTORY OF STEEL TAPES: *Page* 1316

900 w. ENGINEERING NEWS, Dec. 31, 1914.

*DRILL BOAT WHICH LIFTS ITSELF CLEAR OF THE WATER: *Page* 1317

Catamaran scow on four spuds, upon which it lifts itself by cables to insure stability during rough weather. 400 w. 2 ill. ENGINEERING NEWS, Dec. 31, 1914.

EDITORIALS: *Page* 1319

LETTERS: *Page* 1321

ENGINEERING NEWS OF THE WEEK: *Page* 1332

PERSONALS: *Page* 1333

ENGINEERING SOCIETIES: *Page* 1334

NOTES FROM FIELD AND OFFICE: *Page* 1318

CONSTRUCTION NEWS: *Page* 389

CONTRACTS TO BE LET: *Page* 47

WANT ADVERTISEMENTS: *Page* 51

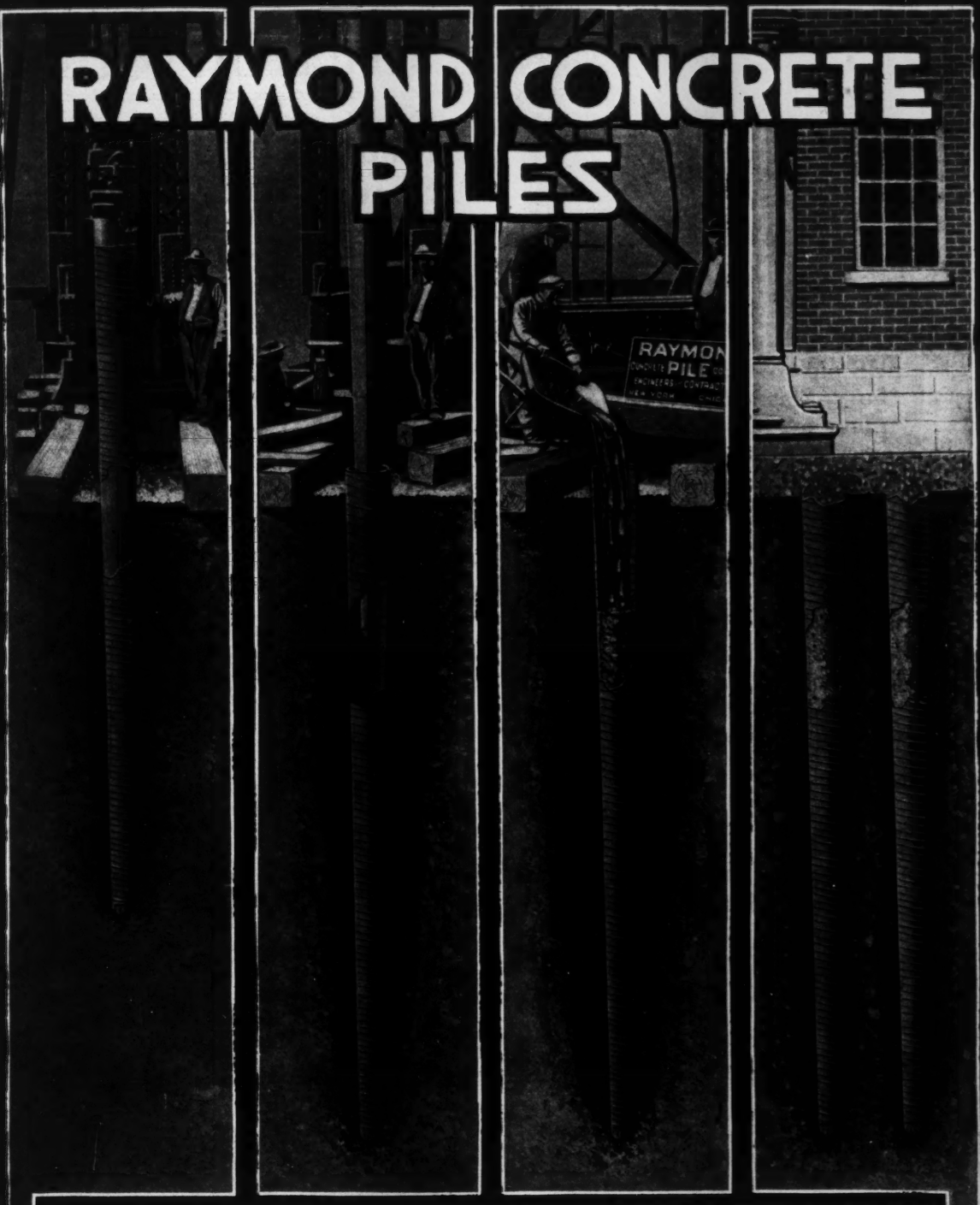
ADVERTISING INDEX: *Page* 80

NUMBER OF COPIES PRINTED THIS ISSUE 22,600

None sent free regularly, no returns from news companies, no back numbers.

THE ADVERTISING
· EDITOR TAKES ·
THIS PAGE TO WISH
EVERY READER
OF ENGINEERING
· · NEWS THE · ·
· GREATEST JOY ·
AND PROSPERITY
FOR 1915

RAYMOND CONCRETE PILES

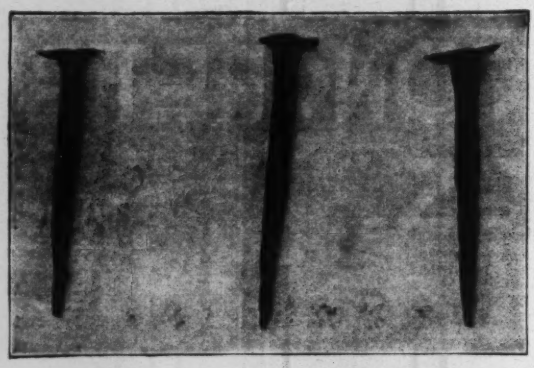


A form for every pile — A pile for every purpose

RAYMOND CONCRETE PILE COMPANY

New York, 140 Cedar St. Branch Offices in all Principal Cities **Chicago, 111 W. Monroe St.**

Raymond Concrete Pile Company of Canada, Ltd., Montreal, Canada



Pure Iron Nails

Made in the Days of Salem Witchcraft

In Service 228 Years and as Good as New

THE old "Wayside Inn" of Sudbury, Massachusetts, made famous by the poet, Longfellow, was erected in 1686. The methods and materials employed were those of a people who built for the future.

Some of the iron nails which had held the original clapboards, and which were therefore 228 years old, were recently extracted, and found in almost perfect condition. These being subjected to exact analysis, were found to contain only seven-thousandths of one per cent. of Sulphur, five-hundredths of one per cent. of Carbon, two-thousandths of one per cent. of Manganese, and the merest trace of Copper.

It is undoubtedly due to the practical exclusion of these elements that the iron has given such splendid service.

Iron of a higher total purity than that secured by the old-time puddling process was not commercially available until the development of Armco-American Ingot Iron.

This is the purest, most even and most carefully manufactured iron on the market, and therefore the most durable in exposed situations.

ARMCO AMERICAN INGOT IRON CULVERTS

in all the details of construction are worthy of this unequaled material. This is the most practical and reliable form of highway and railroad drainage.

For full information on Armco Culverts, Siphons, Flumes, Sheets, Plates, Roofing and Formed Products, write the nearest manufacturer.

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Corrugated Culvert Co.
California, West Berkeley
California Corrugated Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Bloomington
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
Iowa, Des Moines
Iowa Pure Iron Culvert Co.
Iowa, Independence
Independence Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
Kentucky Culvert Co.
Louisiana, New Orleans
Dixie Culvert and Metal Co.
Maryland, Havre de Grace
Spencer, J. N.
Massachusetts, Palmer
New England Metal Culvert Co.
Michigan, Bark River
Bark River Bridge & Culvert Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Minnesota, Lyle
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.
Montana, Missoula
Montana Culvert Co.
Nebraska, Lincoln
Lee-Arnett Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
Nevada, Reno
Nevada Metal Mfg. Co.
New Hampshire, Nashua
North-East Metal Culvert Co.
New Jersey, Flemington
Pennsylvania Metal Culvert Co.
New York, Auburn
Pennsylvania Metal Culvert Co.
North Carolina, Greensboro
Dixie Culvert & Metal Co.
North Dakota, Wahpeton
Northwestern Sheet & Iron Works.
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oklahoma, Shawnee
Dixie Culvert & Metal Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Culvert Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Atlas Metal Works.
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Culvert Co.
Virginia, Roanoke
Virginia Metal Culvert Co.
Washington, Spokane
Spokane Corr. Culvert & Tank Co.
Wisconsin, Eau Claire
Bark River Bridge & Culvert Co.

Elliott-Fisher Co., Harrisburg, Pa. Leading advocates of efficiency methods. Old style factory at left, Modern Kahn System factory at right.

Out With the Old

Small Windows of Wood Dingy Interiors Burnable Construction Uninviting and Out-of-Date.

In With the New

Large Windows of United Steel Sash Daylight Interiors Fireproof-Kahn System Reinforced Concrete Attractive and Modern.

The plant of the Elliott-Fisher Company, Harrisburg, Penn., tells its own story of the wonderful developments of modern building construction and furnishes a striking testimonial of the efficiency of **Kahn Building Products.**

The factory at the left in the above illustration is typical of the best of the old style designs, with its small windows of wood sash, indicating a poorly lighted and dark interior. Contrast this building with the handsome, modern factory at right, daylighted with United Steel Sash and made fireproof by **Kahn System Reinforced Concrete.** In which one of these buildings would you expect to find the greatest efficiency? The larger output? The better workmanship? In which one is there the greatest economy of space? Smaller artificial light bills? Less waste of materials? Which building has the more attractive appearance, and indicates the greater progressiveness? In which building would YOU rather work?

Kahn System Reinforced Concrete
United STEEL Sash—Hy-Rib Concrete Construction

Notice how the large windows of **United Steel Sash** admit a flood of daylight into the interior. Consider the advantages of the **Kahn System** Reinforced Concrete Construction, assuring a building that is fireproof, permanent, economical and free from vibration. Remember also that Hy-Rib Concrete Construction is similarly useful in roofs and sidings of one-story factories, as well as in floors, partitions, and ceilings generally.

With all these many improvements, Modern **Kahn Building** Construction is much more economical than all others, because of the great savings that are effected in reduced insurance, low cost of up-keep, increased life of building, to say nothing of greater efficiency of employees, etc.

So our New Year's Greeting to you takes the form of this practical suggestion for increasing prosperity and happiness. We are grateful to all for the glorious past and enthusiastically hopeful for a greater future. As always, our knowledge and experience are at your disposal, free of all obligation.

KAHN Building Products

TRUSSED CONCRETE STEEL CO.

Reinforcement, Metal Lath, Steel Sash, Armor Plates, Waterproofings, Specialties.

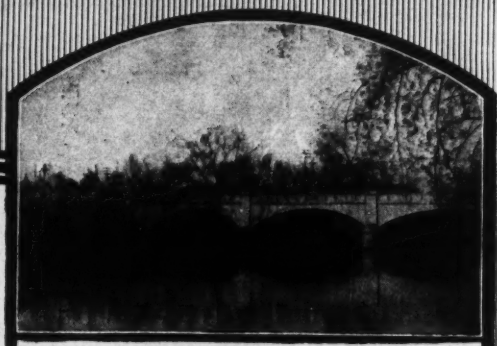
Dept. G-12. **YOUNGSTOWN, OHIO**

Representatives in Principal Cities.

KAHN Building Products

Specify ALPHA and be SURE

Goat Island Bridge, Niagara Falls. ALPHA CEMENT used exclusively.



Bridge at Derby, Conn. ALPHA CEMENT used exclusively.

Some Everlasting Bridges

The concrete bridge stands for strength, for lasting service, for beauty.

Built with good cement, a concrete bridge is a high-class, satisfying investment for the community or the corporation that erects it.

ALPHA Portland Cement

The High-Water Mark of Quality

has been used in building a long list of famous bridges and viaducts. The experienced bridge engineer and contractor knows that he can depend on ALPHA for best results.

ALPHA Portland Cement represents 24 years of experience in cement-making. ALPHA is tested hourly by chemists for quality and uniformity. The burning and grinding are supervised by chemical and efficiency engineers. The result is a Portland Cement of highest possible quality guaranteed to more than meet all standard tests.

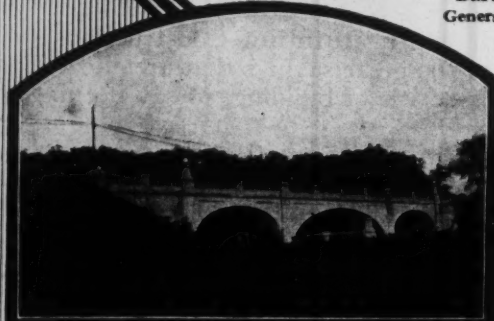
Six great plants on six trunk-line railroads; one plant directly on the Hudson River ideally located for coast, canal and export shipment. Capacity 25,000 barrels daily; storage for 2,000,000 barrels.

Ask for a copy of the ALPHA book showing famous bridges, dams, buildings, etc., built with ALPHA Portland Cement and giving valuable general information bearing on cement and concrete construction.

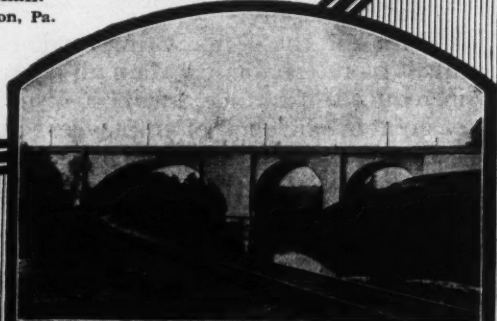
ALPHA Portland Cement Company

Sales Offices: New York, Chicago, Philadelphia, Boston, Pittsburgh, Buffalo, Baltimore, Savannah.

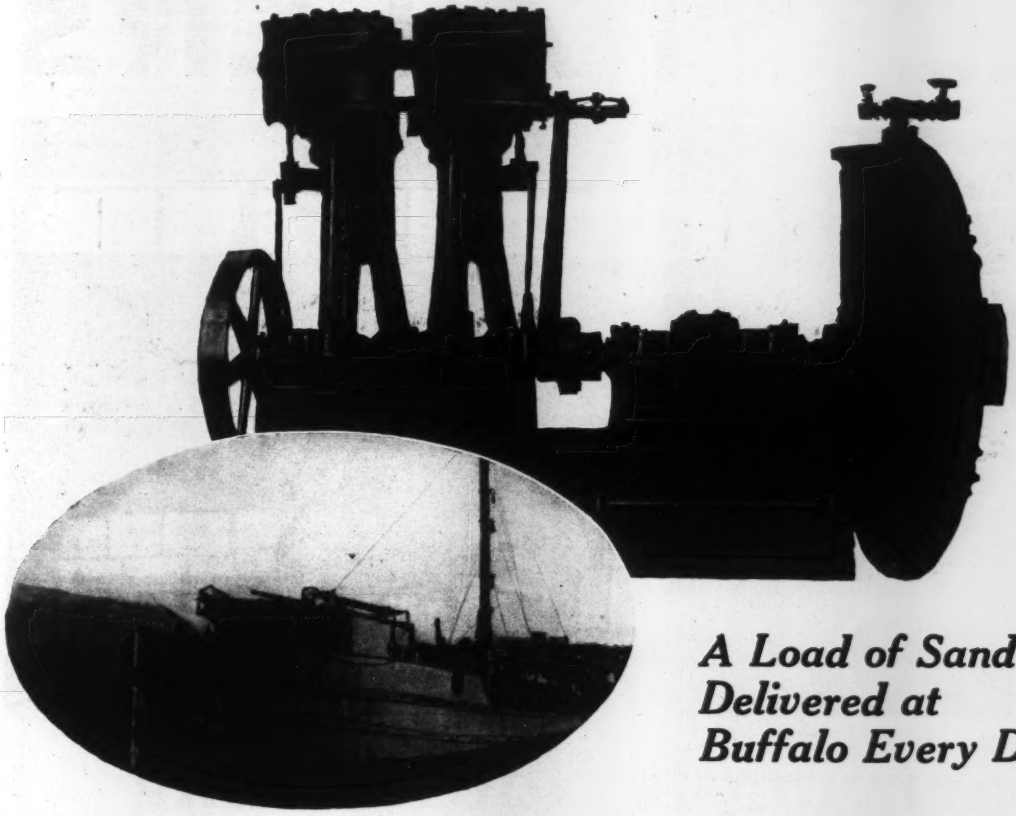
General Offices: Easton, Pa.



Elmwood Avenue Trolley Bridge, New Haven, Conn. ALPHA CEMENT used exclusively.



Edmondson Avenue Bridge, Baltimore, Md. ALPHA CEMENT used exclusively.



A Load of Sand Delivered at Buffalo Every Day

MORRIS SAND SUCKER

THIS 12" MORRIS SAND PUMP, direct connected to a 11" x 10" double vertical engine, is in daily operation on the Empire Limestone Co.'s boat "Kathryn." A load of 570 yds. of sand and gravel is delivered each day to their Buffalo dock, coming from the pumping ground in lower Niagara River.

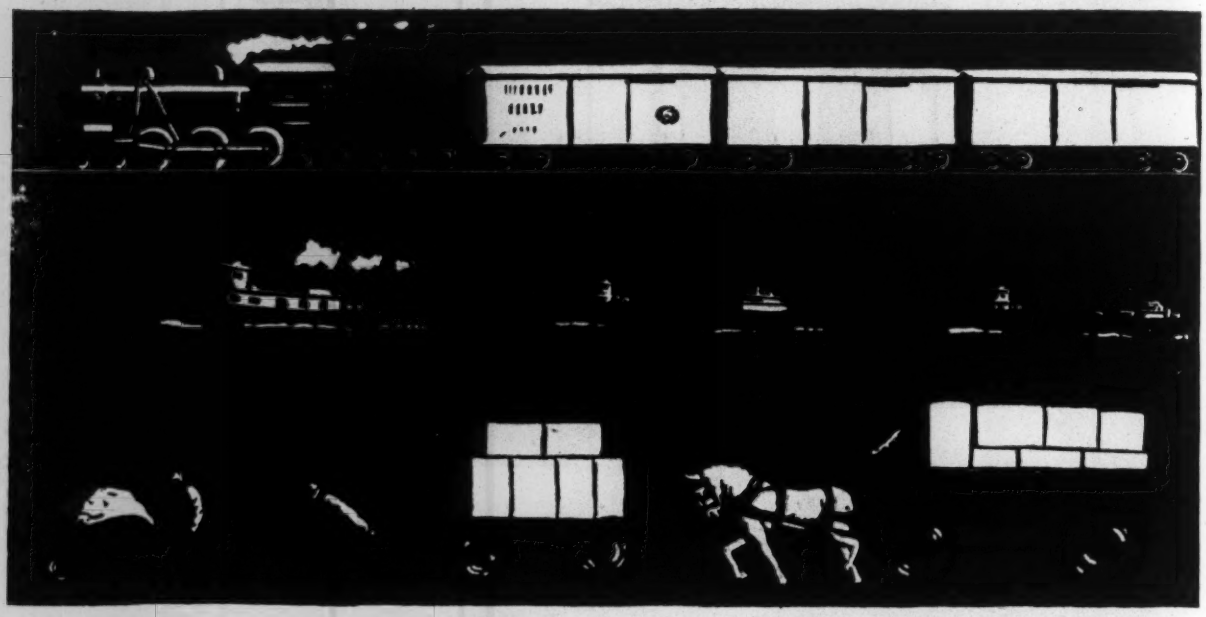
For strength, dependability and high efficiency, MORRIS PUMPS are without an equal. This is *one* reason why there are more than 17,000 of them in use today.

If you are interested in *pumping* or *hydraulic dredging*, the "126-page MORRIS BOOK" will interest you. Send a postal request and it will be mailed FREE to you.

Morris Machine Works

Baldwinsville, Builders of Dredges, Centrifugal Pumps, Pumping Engines. Branches in All Principal Cities. **New York, U. S. A.**

ALL TRAILERS



Carrying Is Not Hauling

Five types of transportation are shown here. All use the principle of the trailer. Ever since wheels have been used under loads it has been known that you can pull at least three times as much as you can carry.

Trailers are older than Trucks.

The motor truck is a new institution; but the idea of the trailer is prehistoric.

The principle of the trailer is vital to all modes of efficient transportation, including motor trucks.

It is founded on the law that any type of motive power can pull more than it can carry.

Your motor truck, loaded to capacity, is only doing one-half to one-fourth what it can do in the way of actual hauling. Loaded to rated capacity, it carries all it can; but it has a draw-bar pull still available up to three or more times that capacity.

Stopping the Leak in Truck Power

Troy Trailers convert unused draw-bar pull into actual merchandise deliveries at small additional expense for truck tires or gasoline.

Troy Trailers multiply your net deliveries about four times.

Doing this at no appreciable increase in truck operating costs, Troy Trailers frequently cut your costs per ton mile to one-fourth.

Troy Trailers Are Not Wagons

Ordinary wagons won't work behind motor trucks. Wagons are not designed right, built right, hitched right, sprung right, steered right, nor right in any way for motor truck loads, roads, speeds or conditions.

A motor truck trailer must be specifically and rigorously designed and built for its purpose. It can't pay and it won't last if it isn't.

Troy Trailers are built on eight years of experience in making trailers for traction engines and on three years' experience making trailers for motor trucks.

Troy Trailers are machines rather than vehicles. They represent as much engineering skill as the best motor truck. They have been in operation under the worst possible service conditions and they have made good.

The thing that will interest you most is "What have Troy Trailers done for the other fellow whose working conditions are like mine?" We can no doubt give you facts and figures in our answer. Write for Troy Trailer Booklet 4-EN, free and without obligation.

The Troy Wagon Works Company
TROY, OHIO

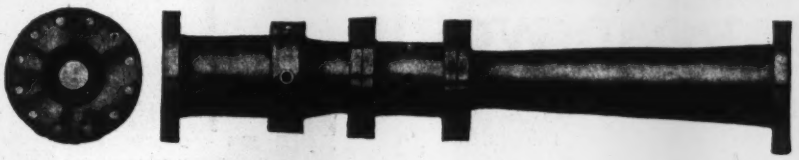
NEW YORK
50 Church Street

DETROIT
319 Hammond Building

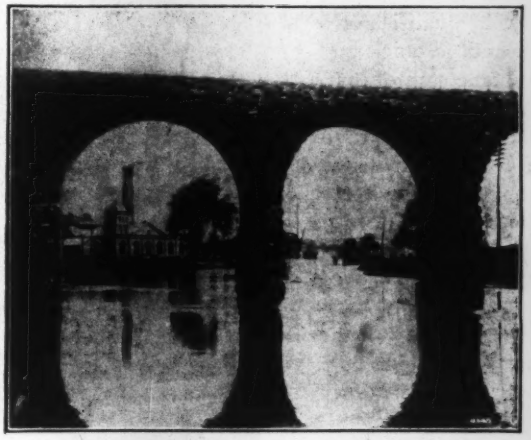
WASHINGTON, D. C.
505 Riggs Building

Troy Trailers

Page 9—The Venturi Page
Series II.—Venturi Engineering News No. 20



Repeated Tests Proved the Venturi Meter to Be Accurate to Within 0.2 of 1%



Pumping Station and Aqueduct, Lancaster, Pa.

THE water supply to the City of Lancaster, Pa., is filtered by a private company which delivers it to the city pumping plant. It is therefore to advantage to both parties that the amount of water consumed be accurately known.

The water flows by gravity from a carefully finished and calibrated clear well at the filtration plant through a 30-inch Venturi Meter equipped with a Type D Register-Recorder into the suction well of the pumps.

By means of a hook gauge the amount of water drawn from the clear well may be accurately determined during even so short a run as two hours. At the end of each month careful tests of the accuracy of the Venturi Meter are conducted by comparing its readings with the displacement observed at the well.

Mr. F. D. Shaw, the superintendent and engineer in charge of these tests, states that THE VENTURI METER HAS MAINTAINED AN AVERAGE VARIANCE OF LESS THAN ONE-FIFTH OF ONE PER CENT.

The accuracy of the Venturi Meter remains unimpaired even after years of service.

Venturi Meters measure cold and hot water, brine, chemical solutions, sewage, oil, gas, air and steam. They indicate the instantaneous rate of flow on a calibrated dial, register the total amount already passed, and trace an indelible time-rate record on a 24-hour chart of every variation in the rate of flow and the moment that it occurred.

You need this information in your plant. Why not install the required Venturi Meter tubes this fall while you are placing your pipe lines? The register may be ordered and connected at a later date. Write for Catalog No. 84-N.

Venturi Meter
Type M Register-
Indicator-Recorder

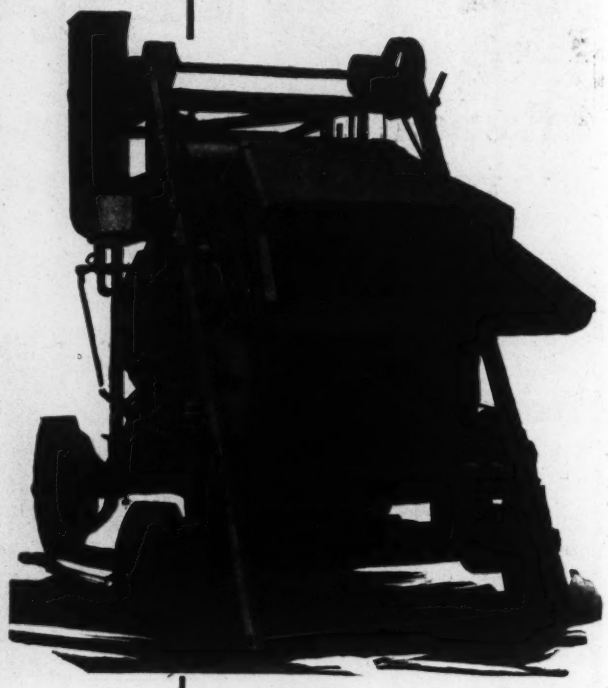
Builders Iron Foundry, Providence, R. I.

BRANCH OFFICES:—30 Church St., New York City. Guy F. Linn, Oliver Building, Pittsburgh, Pa. The Rookery Chicago, Ill. N. B. Livermore & Co., Merchants National Bank Building, San Francisco, Calif. Northwestern Equipment Co., Railway Exchange, Portland, Ore. Northwestern Equipment Co., Alaska Building, Seattle, Wash.

THE PAYING TELLER IN ROAD WORK

The head-line is wrong, or rather, it's inadequate. In concrete road work, the Smith-Chicago Record Paver is *paymaster general.* It's the conceded chief of traction paving machines, because of its huge output. Follow one of these outfits for a day—watch the gang rush at the wide two-man skip. See the wheelbarrows go to and fro, regular as the engine turns—fast as the men can hump. It's a real lesson in the pace-making qualities of a fast mechanical mixer. The mix is quick and good—the big scoop blades take care of that The 12-foot telescopic swivel chute is fast and reliable. It can't fail while the laws of gravitation hold good. But, after all, the one *most important* single feature about a paver is the charging skip. That's where the S-C Record Paver excels. The pan-shaped skip is broad enough for two barrows at once—low backed and easy to fill—fast in action—quick to empty. This ad. just begins the story of the S-C Record Paver. Suppose you give us a chance to complete it. Put your name down for a copy of our S-C Paver Bulletin No. 71-J. No obligation.

No. 509 Smith-Chicago Traction Drive Paver with skip 6 feet wide to allow two barrow men to empty their barrows at once.



Your S-C Paver Bulletin, Please.

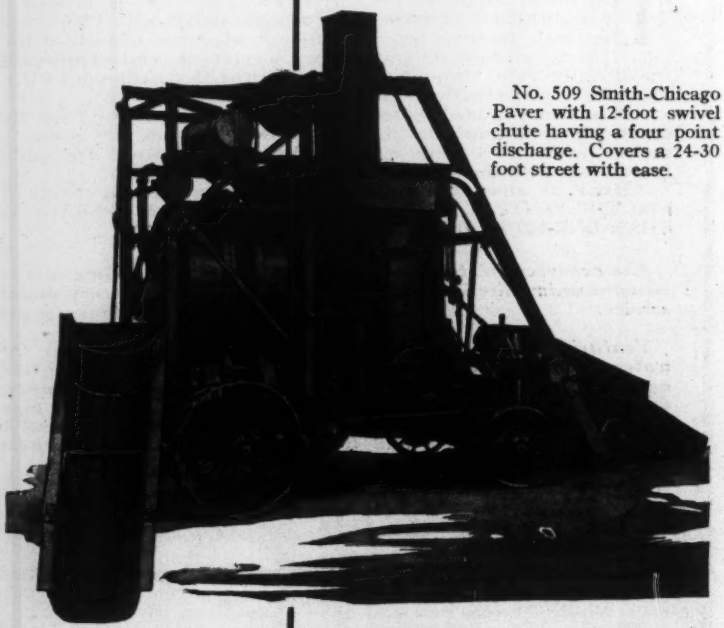
Name.....

Address .....

.....

.....

.....



No. 509 Smith-Chicago Paver with 12-foot swivel chute having a four point discharge. Covers a 24-30 foot street with ease.

THE T. L. SMITH COMPANY

3102-J-Hadley St., MILWAUKEE

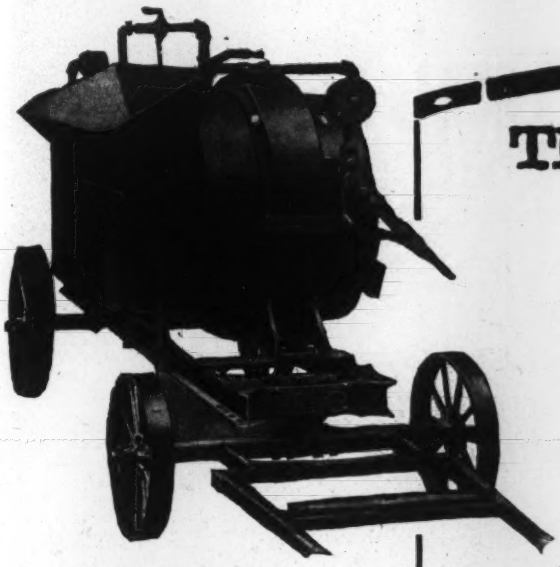
1316-J-Old Colony Bldg., CHICAGO, ILL.

PERKINS & CO., 1114-J Oliver Bldg., BOSTON, MASS.

W. J. CULLEN, 1468-J Hudson Terminal Bldg., NEW YORK, N. Y.

J. J. SHANNON & CO., Dept. DJ-1744 Market St., PHILADELPHIA, PA.

M. S. SEIBERT & CO., 310-J Wyandotte Bldg., COLUMBUS, OHIO.

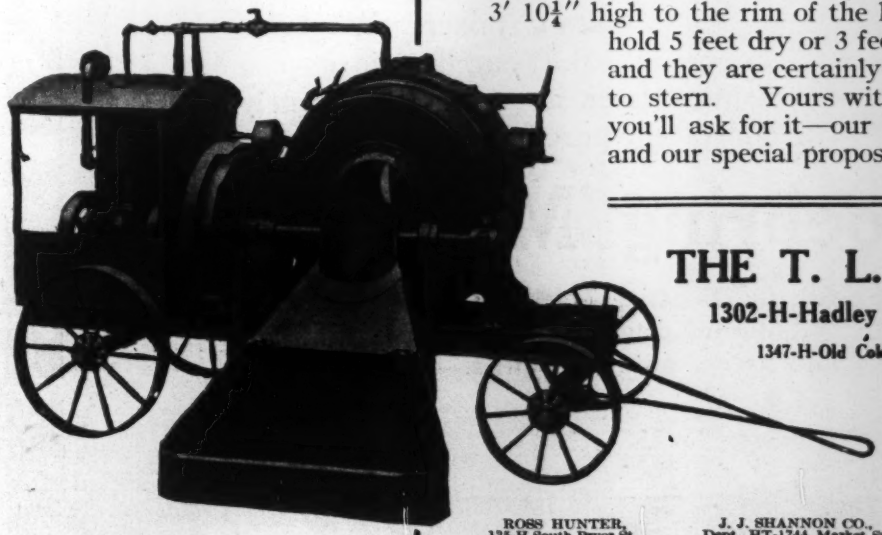


$246 F. O. B. Factory

Smith Mixerette on steel truck with gasoline engine, and steel house. Mixer equipped with waist high gated batch charging hopper.

Smith Mixerette with ground level power charger. This loader is gear driven. It lifts easily and rapidly without straining the mixer.

$315 F. O. B. Factory



THE IRON CROWN OF POWER

When you're looking for a mixer, buy one that "sizes up right"—a machine with a good pedigree, a straight guarantee and a good record. Get one with a good physique—with plenty of metal in it. There's "class" among small mixers, just as among big fellows; and it's not hard to detect it either.

Do you want smooth, fast work at the charging end, without jerking, binding, wrenching? Do you want mixer service—the drum ring protected from dirt—the gear teeth guarded against stray stones—the wearing surfaces always oiled? Do you want thick, creamy, sure-enough concrete and lots of it? Then, get the

SMITH MIXERETTE

with enclosed drum ring and geared loader. It's a safe buy. It carries all the ear-marks of good workmanship and careful design. There's plenty of metal at every point and it's in the right place. The Mixerette's a machine to be proud of. You *will* be proud of it—prouder every day you own it. You'll agree with us that it has earned the iron crown for fast, effective, honest work.

If reduced weight is of prime importance, take a look at our Mixerette with gated batch hopper—3′ 10¼″ high to the rim of the hopper. Both rigs hold 5 feet dry or 3 feet of wet concrete; and they are certainly *mixers*, from stern to stern. Yours without obligation—if you'll ask for it—our Mixerette booklet and our special proposal No. 110-H.

THE T. L. SMITH CO.

1302-H-Hadley St., MILWAUKEE

1347-H-Old Colony Bldg., CHICAGO

W. J. CULLEN,
1482-H Hudson Terminal Bldg.,
NEW YORK, N. Y.

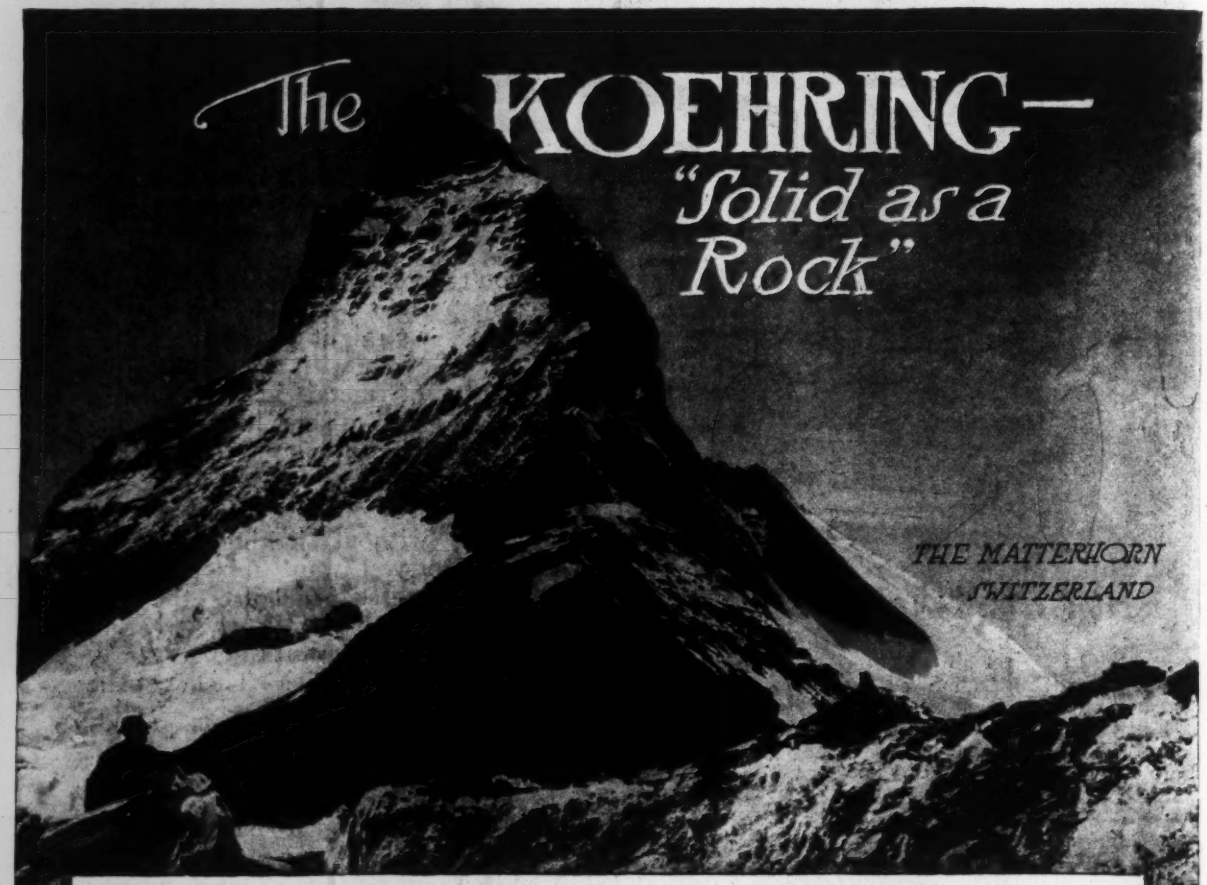
J. E. KING,
639-H Germania Savings Bank Bldg.
PITTSBURGH, PA.

M. S. SEIBERT & CO.,
303-H Wyandotte Bldg.,
COLUMBUS, OHIO.

ROSS HUNTER,
135-H South Pryor St.,
ATLANTA, GA.

J. J. SHANNON CO.,
Dept. BT-1744 Market St.,
PHILADELPHIA, PA.

QUEEN CITY SUPPLY CO.,
205-H Elm St.,
CINCINNATI, OHIO.



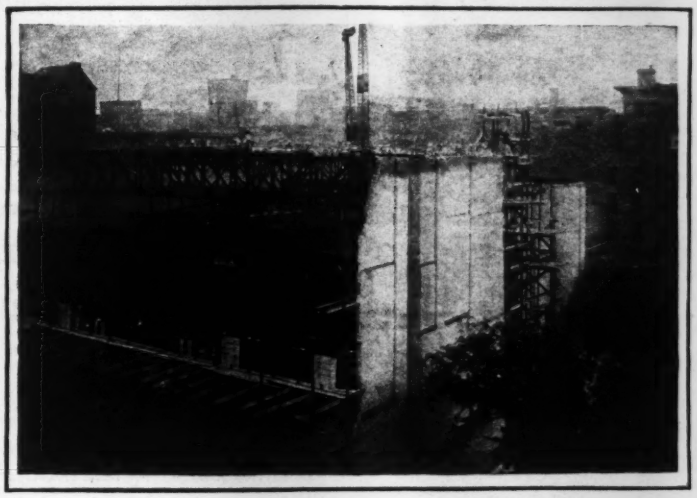
It is a fact—

We know of a contractor who was strong for a certain mixer. Wouldn't use any other. But, one day he gave a Koehring Mixer a try-out. Recently the contractor purchased six

Koehring Mixers—

Ask the Koehring Machine Co., of Milwaukee, Wis., for full details and Catalog No. 19D. We have agents in principal cities.

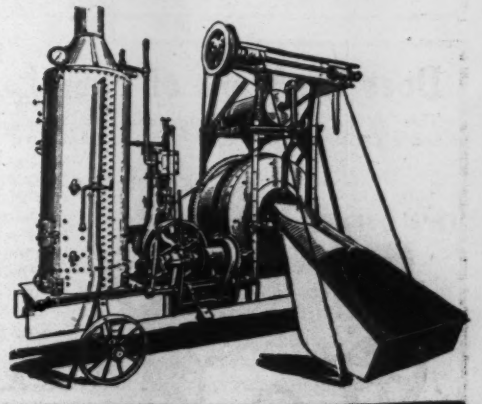
"Bought in 1904 and still Delivering the Goods"



W. J. Hoy Co., General Contractors, tell us this about the

Ransome MIXER

which mixed their concrete on the job pictured above—Palace Theatre, Minneapolis. They bought this RANSOME in 1904—but it's still making money for 'em.



RANSOME Mixers will do this for YOU, too. Write nearest office for details.

Ransome Concrete Machinery Co.

Dunellen Chicago Office: Fisher Building **New Jersey**

W. E. AUSTIN MACH'Y CO., Southern Sales Mfgrs., Atlanta, Ga., New Orleans, Houston, Dallas, Memphis, Richmond. F. H. Hopkins & Co., General Agents for Canada, Montreal, Winnipeg, Vancouver.

Boston, 6 Beacon Street; Buffalo, 4 Builders Exchange; Cincinnati, Merchants Building; Cleveland, 509 Bangor Building; Columbus, T. L. Bissell Co.; Denver, Mine & Smelter Supply Co.; Detroit, W. H. Anderson Tool & Supply Co.; El Paso, Mine & Smelter Supply Co., Kansas City, Kan., Contractors Machinery Co.; Los Angeles, N. B. Livermore & Co.; Mexico City, Mex., Mine & Smelter Supply Co.; Minneapolis, Charles Houston, Plymouth Bldg.; New York, 103 Park Ave.; Philadelphia, Commonwealth Building; Pittsburgh, The Baird Mach'y Co., 123 Water St.; Portland, Ore., Northwestern Equipment Co.; Salt Lake City, Mine & Smelter Supply Co.; San Francisco, N. B. Livermore & Co.; Seattle, Northwestern Equipment Co.; St. Louis, Chemical Building.

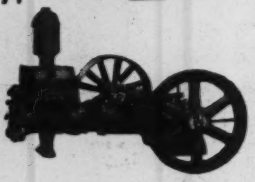
FOREIGN AGENTS: Buenos Aires, Venge y Cia, Casilla-Correo 1273; Copenhagen, Isidor Heimann & Co.; Milan, E. Parodi Delfino.

STEAM McG POWER

McGOWAN PUMPS

In All Types For All Uses

The constantly increasing sales of McGowan Pumping Equipment in highly competitive territory is accepted as evidence that more consideration is given the product that affords continuous and satisfactory service, with a low maintenance cost, than is given the question of price.



Our Standard of Quality means Our Standard of Price

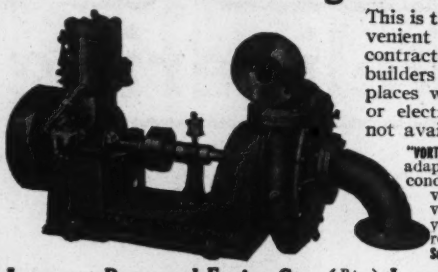
Regardless of the general tendency toward cheaper construction, we have maintained a high standard of work in our Pumps, realizing that cheap construction and efficiency can not be harmonized in the construction of any Pumping Unit. The difference in price of McGowan Pumps, though slight, will be earned many times over through increased service to the User in comparison to that afforded by pumps of the usual construction.

CATALOGS

392—Air Compressors
402—Single and Duplex Power Pumps
482—Deep Well Steam and Power Pumps
412—Triplex Power Pumps
422—Centrifugal Pumps
302—Single Steam Pumps
312—Duplex Steam Pumps

THE JOHN H. McGOWAN CO. CINCINNATI OHIO

Here's A "VORTEX" Pump For Gasoline Engine Power



This is the most convenient pump for contractors, road builders and many places where steam or electric power is not available.

"VORTEX" PUMPS are adaptable to every condition of service. Get our advice regarding your pumping requirements.

Send for Bulletin A

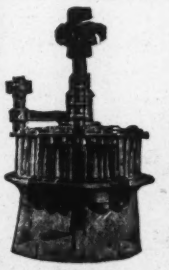
Lawrence Pump and Engine Co., (P.O. Box 70) **Lawrence, Mass.**

New York Office, 90 West Street

Drive Your Generator With A Samson Turbine

You can save money if you will use a Samson to drive your generator because the Samson attains a quicker speed than any other turbine operating under the same conditions. This allows the use of lighter and consequently lower priced transmission machinery.

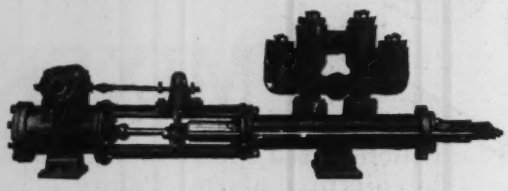
Samson turbines use the water economically; the speed is quick and steady; they develop great power. Write us today.



James Leffel & Co.

302 Lagonda St., Springfield, Ohio

THE BLAKE-KNOWLES Single End Packed Plunger Pump Pot Valve Pattern best for Heavy Pressure Boiler Feeding and for water carrying sediment



Write for Bulletin BK 886-19.

The Blake & Knowles Steam Pump Works

115 Broadway, New York **Works: E. Cambridge, Mass.**

Branch Offices in All Principal Cities B 251.1

HYDRAULIC TURBINES

Turbines designed for heads from 5 feet to 600 feet. Steel Piping, Head Gates and Trash Rack also furnished.

S. Morgan-Smith Co., - - York, Pa.

Branch Offices 644 American Trust Bldg., Chicago, Ill.
176 Federal St., Boston, Mass.

Pumps and Pumping Engines Oil Engines and Gas Engines

Write for bulletins

Naticnal Transit Co. , , Oil City, Pa.

Does the Work of Four Laborers

The Junior Trench Pump will lift water containing sand, gravel or sewerage. Can be operated for 7 hours on 1 gallon of gasoline with a capacity of 3500 gallons per hour. Built for hard service. Any diaphragm pump can be fitted to the outfit.

Send for Booklet.

A. A. Parker

Waterford, N. Y.

Edson Diaphragm Pumps

Operated by Man or Gasoline Power

will handle Sand, Mud, Gravel, Sanitary Deposits and anything limpid enough to flow, without clogging or injury. *Send for Descriptive Catalogue.*

Edson Manufacturing Company

Established 1859. **278 Atlantic Avenue, Boston, Mass.**

STEAM PUMPING ENGINES

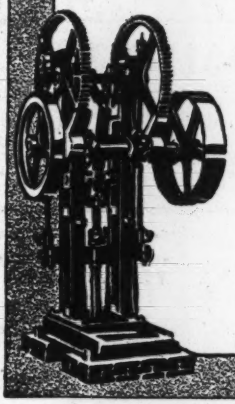
We are prepared to build the most advanced type of **Pumping Engine** of either the crank and fly-wheel or direct acting type, for **Water Works, Mines** or **Irrigation;** and centrifugal where adaptable.

R. D. WOOD & CO., 400 Chestnut St., Philadelphia

DOWNIE DEEP WELL PUMPS

When considering the purchase of Deep Well Pumps, give our Engineering Department an opportunity to tell you what a Downie Pump can do under the conditions which you have. This will cost you nothing and does not in any way place you under obligation to us.

We have been designers and builders of deep well pumps for many years and our experience should be of value to you.



Catalog No. 6 gives the details of our complete line. If you are interested in pumps and pumping we will be pleased to mail you a copy FREE. Let us have your name and address.

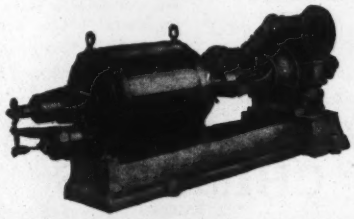
Keystone Driller & Pump Co.

Beaver Falls, Pa.
170 Broadway New York
Monadnock Blk. Chicago
Carthage, Mo.

HIGH SPEED SINGLE AND MULTI-STAGE

CENTRIFUGAL PUMPS

For Direct Connection To Steam Turbines Or Electric Motors



We are prepared to design pumping machinery for specified conditions involving high efficiency and long life. All parts accessible and interchangeable. Send us a description of your problems.

LAWRENCE MACHINE COMPANY, Lawrence, Mass.
New York Office, 30 Church Street

Deane of Holyoke

An inscription to look for when you are looking for

POWER PUMPS

We build the most complete line in the world, which could not be true if we had not been building the right kind right along. You will be interested in the details given in Bulletin D204-19.

International Steam Pump Co.

Deane Steam Pump Plant
New York Office: 115 Broadway Works: Holyoke, Mass.
Branch Offices in All Principal Cities. D235.1

The Hose to Use

For

The air drill
The steam drill
The air riveter
The pile hammer
The steam line
The suction to pump
Every construction job.
(In all sizes up to 12″)

Contractors — you have used rubber hose for your drills and riveters and hammers. You have used it for many and varied purposes, because you wanted something with flexibility —easier to handle than rigid piping.

But the result has always been the same. Rubber hose will not last.

Here's the thing—an all-metal tubing that will last as long as metal piping—that is just as flexible as rubber tubing, and yet 30% lighter.

It is non-leakable. Will not kink, char, flatten, or wear out.

One trial will convince you.

Ask for the Booklet.

Pennsylvania Flexible Metallic Tubing Co.

Cor. Broad and Race Sts., Philadelphia, Pa.
Works: 72d and Powers Lane, W. Philadelphia
NEW YORK, N. Y.—30 Church Street
CHICAGO, ILL.—Peoples Gas Building
BOSTON, MASS.—11 High Street

U. S. Flexible Metallic Tubing Co.

LOS ANGELES, CAL.—450 East 3d Street
SAN FRANCISCO, CAL.—63 Main Street
HOUSTON, TEX.—429 First Nat'l Bank Bldg.
SEATTLE, WASH.—509 Maynard Bldg.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

BABCOCK & WILCOX—STIRLING—RUST

WATER TUBE STEAM BOILERS

STEAM SUPERHEATERS
Works: BAYONNE, N. J.

MECHANICAL STOKERS
BARBERTON, OHIO

BRANCH OFFICES:

ATLANTA, GA., Candler Bldg.
BOSTON, 35 Federal Street
CHICAGO, Marquette Bldg.
CINCINNATI, O., Traction Bldg.
CLEVELAND, New England Bldg.
DENVER, 435 Seventeenth Street
LOS ANGELES, I. N. Van Nuys Bldg.
NEW ORLEANS, Shubert Arcade
PHILADELPHIA, North American Bldg.
PITTSBURGH, Farmers' Deposit Bank Bldg.
PORTLAND, ORE., Spaulding Bldg.
SALT LAKE CITY, Kearns Bldg.
SAN FRANCISCO, 99 First Street
SEATTLE, WASH., Mutual Life Bldg.
HAVANA, CUBA, 116½ Calle de la Habana

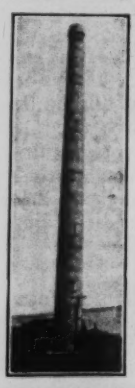
Monuments of Strength and Economy

KELLOGG CHIMNEYS

Unexcelled in strength. Resist high temperature, weather and corrosive gases. Not one has failed. Designed by experts to give the right draft for your plant. Require no attention or repairs. They are guaranteed for 5 years.

The M. W. Kellogg Company, Send today for Bulletin No. 60. **50 Church Street, New York**

Chimneys and Welded Piping.



WEBER CHIMNEYS

REINFORCED CONCRETE

CONIFORM AND CYLINDRICAL TYPES

HUNDREDS IN USE

Weber Coniform Chimney

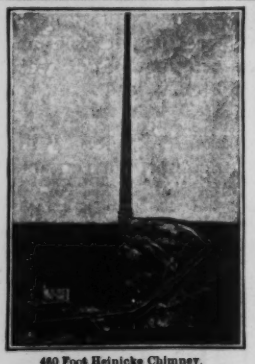
Height, 147 ft. Inside diameter, 6 ft.
Built for J. F. Wilcox & Sons, Council Bluffs, Iowa.

The Weber Chimney Company
1453 McCormick Bldg., CHICAGO, ILL.
New York Office, 30 Church St.

GAS FURNACES
AND
Heating Machines
FOR
MECHANICAL HEATING PROCESSES

American Gas Furnace Co.
Gas Engineers and Manufacturers
24 JOHN STREET - - NEW YORK
Send for Illustrated Catalogue.

We Make
Annealing,
Hardening,
Assaying,
Melting,
Forging,
Enameling,
Case Hardening Machines,
Coloring and Tempering Machines.
Also Fuel Gas Plants, Positive Pressure Blowers, and complete outfits for Machine Shops and factories.



460 Foot Heinicke Chimney.
Has Carried Acid Gases for 21 Years with No Decay Whatever.

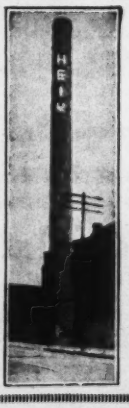
H. R. HEINICKE
INCORPORATED

Perforated Radial Brick Chimneys

WRITE FOR NEW CATALOGUE

147 FOURTH AVENUE NEW YORK

Branch Offices
Drexel Building, Philadelphia, Pa.
142 Milk St., Boston, Mass.
8 Beaver Hall Sq., Montreal, Que.
Webster Building, Chicago, Ill.
Factory: Newcomerstown, Ohio



WIEDERHOLDT CHIMNEYS
(PATENTED)

are built of the three strongest and most durable building materials known to the world.

Hard Burned Fire Clay
High Carbon Steel
Portland Cement Concrete

Hundreds in use and never one cent for repairs.
The most satisfactory and economical chimney ever produced.

Send for list of users and illustrations.

WIEDERHOLDT CONSTRUCTION CO.
Commonwealth Trust Building, ST. LOUIS, MO.

BRICK CHIMNEYS CONCRETE
FOR ALL PURPOSES.

THE HEINE CHIMNEY CO.
123 W. Madison St., Chicago, Ill.

Branch Offices:
New York, Boston, Philadelphia, Buffalo
Cincinnati, Pittsburgh, St. Louis, Toronto

Perforated Radial Brick
CHIMNEYS
BERGEN & LINDEMAN, Inc., 30 Church St., New York
Branch Offices: Philadelphia, Boston.

Instant Power

For driving generators, pumps, compressors or any other machinery.

The Snow Oil Engine

Starts instantly and takes full load in less than one minute. It obviates the expense of the auxiliaries essential to a steam plant, and when not in operation there is no standby loss. Simple and strong in construction; reliable in operation; runs evenly and quietly. The "cheapest source of power" is described in detail in Bulletin S-120-19.

Write for a copy.

International Steam Pump Co.
Snow Steam Pump Plant

Works: Buffalo, N. Y. **New York Office: 115 Broadway**
Branch Offices in all Principal Cities. S130.2

Now's the Time to Mail this Coupon

Please send me your gasoline engine catalog, and tell me, so far as you can, how I can derive pronounced **Economies** from the use of OTTOS. I am not obligated in any way. I want information.

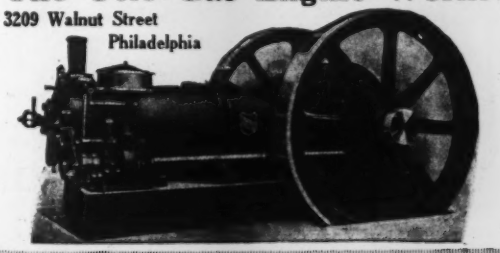
Kind of Service.....H.P. Required.....
Name .....
Address.....Eng. News
.....

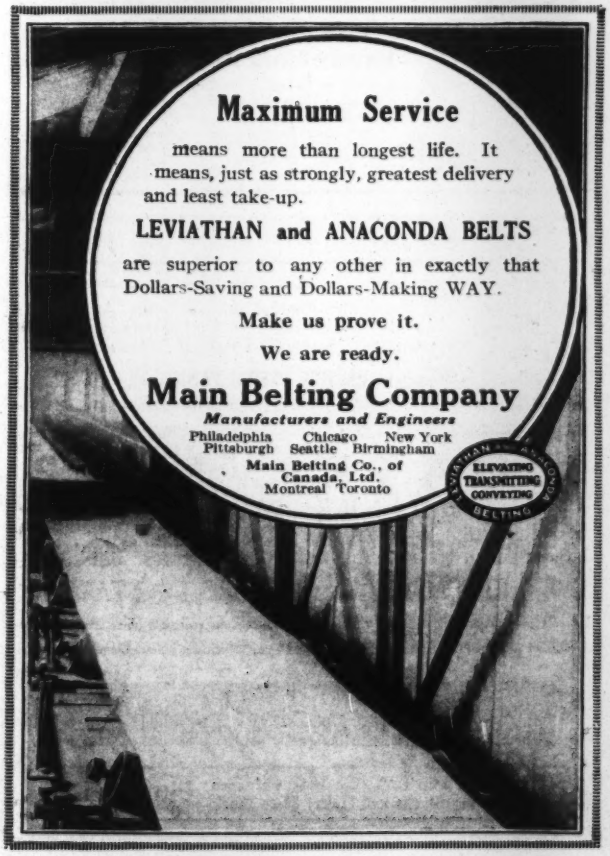
Let Us Show You their Ultimate Economy

Otto Gasoline Engines

Here are things that you want to know, and that we can't tell you in an ad: What will be the first cost? If I pay this price, how can I tell that it's the best investment I can make? If the OTTO is better, is it a matter of principle, design or construction? Why is it best for **my** business? Is it the most **reliable** power for **my** business? What will this power have cost me when the engine is finally worn out? Then, **where** and **how much** will be my profit? Send the coupon above and we'll send the answers, or better still, tell us your conditions in a letter.

The Otto Gas Engine Works
3209 Walnut Street
Philadelphia





Maximum Service

means more than longest life. It means, just as strongly, greatest delivery and least take-up.

LEVIATHAN and ANACONDA BELTS

are superior to any other in exactly that Dollars-Saving and Dollars-Making WAY.

Make us prove it.

We are ready.

Main Belting Company
Manufacturers and Engineers
Philadelphia Chicago New York
Pittsburgh Seattle Birmingham
Main Belting Co., of Canada, Ltd.
Montreal Toronto

ELEVATING TRANSMITTING CONVEYING BELTING

If the Boiler Were a Mile from the Engine

—and the pipes were covered with J-M Asbesto-Sponge Felted Pipe Covering, the loss of heat through radiation and condensation would be far less than that lost in a hundred feet of poorly-insulated pipe.

Its insulating efficiency is so much greater than that of ordinary covering that an installation of J-M Asbesto-Sponge Felted Pipe Covering will save its cost in from five months to a year.

J-M Asbesto-Sponge Felted Pipe Covering

is made of many layers of thin felt, composed of pure asbestos fibre and finely-ground sponge. It is extremely tough and flexible, so that vibration, moisture, heat and rough usage will not cause it to crack, crumble or lose its insulating efficiency. It can be repeatedly taken off and replaced without injury.

Its high insulating value is due to the large amount of confined "dead air"—the best non-conductor known.

Write nearest branch today for interesting J-M Asbesto-Sponge Felted Booklet No. 100.

H. W. JOHNS-MANVILLE CO.

Atlanta Denver Memphis Philadelphia
Baltimore Detroit Milwaukee Pittsburgh
Boston Galveston Minneapolis Portland
Buffalo Indianapolis Newark St. Louis
Chicago Kansas City New Orleans Salt Lake City
Cincinnati Los Angeles New York San Francisco
Cleveland Louisville Omaha Seattle
Columbus Toledo 2801

THE CANADIAN H. W. JOHNS-MANVILLE CO., LTD.
Toronto Montreal Winnipeg Vancouver

Erected at Porcupine, Ontario, Canada
A double line of 8′ diam. STEEL PIPE 1300 ft. long

STRUCTURAL AND STEEL PLATE WORK

is our specialty. We fabricate and erect from your drawings, or will design your structure for you.

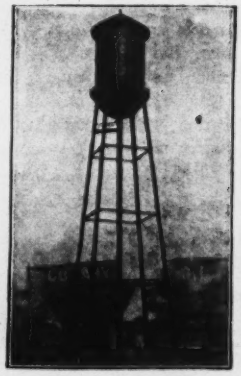
No Work Too Large for us to handle in the minimum of time. May we estimate on your requirements.

Walsh's Holyoke Steam Boiler Works
Holyoke, Mass.

Elevated Water Tanks, Standpipes, Stacks, Pressure Tanks, Etc.

All kinds of plate steel construction

TIPPETT & WOOD
PHILLIPSBURG, N. J.
New York Office: 135 William Street



Elevated Steel Tanks

Hemispherical and Segmental Bottoms

Manufactured at Pittsburgh, Pa. Erected Anywhere

We have special designs for Municipal, Railway and Industrial service.

Catalog No. 7 sent upon request.

Pittsburgh-Des Moines Steel Co.

Pittsburgh, Pa., 801 Curry Building
New York City, 383 Hudson Terminal Bldg
Dallas, Texas, 1220 Praetorian Building

Des Moines Bridge and Iron Co.

Des Moines, Iowa, 922 Tuttle Street
San Francisco, Cal., Monadnock Building

Bakelite-Dilecto
also
Vulcanized Fibre

Waterproof—Permanent—Strong—A laminated *Insulating* material of highest efficiency.

In Sheets—Rods—Tubes—Special Shapes.

The Continental Fibre Company **Newark, Del.**
Chicago—McCormick Building New York—Woolworth Building

The Solution of Many Expansion Joint Troubles

will be found in this Alberger Bulletin No. 19-E. It is replete with exact data upon the subject.

Alberger Pump and Condenser Company
140 Cedar Street, New York
Chicago, Pittsburgh, St. Louis, San Francisco, Boston, New Orleans, Atlanta.

Foster Superheaters

Increase capacity of boilers, give more power with less fuel, and prevent all loss and trouble due to wet steam.

Power Specialty Co., 111 Broadway, N. Y.

JOINTITE **FILTITE**

Permanent, Watertight Sewer Pipe Joint Compounds

Also Miller Flush-Tank Siphons, Automatic Sewage Ejectors, Centrifugal Pump Outfits, Sewage Disposal Apparatus.

Chicago — PACIFIC FLUSH-TANK CO. — New York

Garbage Disposal Plants

Dryers, Condensers and Percolators. Elevators, Conveyors and Tanks

Complete Plants for Large or Small Cities.

THE C. O. BARTLETT AND SNOW CO., CLEVELAND, OHIO, U.S.A.

COATESVILLE BOILER WORKS

New York **30 Church Street**
COATESVILLE, PA.
Philadelphia **Morris Building**

STEEL TANKS - BOILERS - STACKS

THE IMPROVED EQUIPMENT CO.

60 Wall Street, New York City

COMBUSTION ENGINEERS

DESIGNERS AND BUILDERS OF

COMPLETE GAS PLANTS GAS BENCHES
LIME BURNING PLANTS GAS PRODUCERS
SPECIAL INDUSTRIAL FURNACES

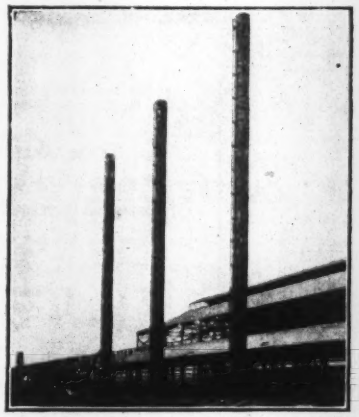
JAMES McNEIL & BRO. CO

LARGE SIZE RIVETED STEEL PIPE

Stand Pipe Iron Tanks Blast Furnaces
Self-supporting Stacks and Heavy Plate Work **Pittsburgh, Pa.**

Steel Plate Work

of every description for every purpose.



Stacks, Standpipes, Tanks. Penstocks, etc.

Send us drawings for estimate.

Kittoe Boiler & Tank Company

Main Office and Factory, Canton, Ohio

Chicago Office, Fisher Building

Dover Steel Stacks and Tanks

measure up to every purpose for which stacks and tanks are used. They always do what is expected—at a low up-keep cost. Dover stacks, standpipes, tanks, etc., are on some of the greatest plants in America. Dover—always better than guaranteed.

Dover Boiler Works, 50 Church St., New York City

Our Specialty is the

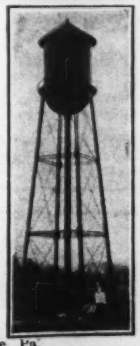
Design, Manufacture and Erection

of

ELEVATED STEEL TANKS AND STAND PIPES

for Municipal, Railroad, and Factory Service. We also build oil tanks, coaling stations, bridges, turn tables, building and structural material.

Write today for latest catalog, No. 10.



Chicago Bridge and Iron Works

Offices: Chicago, 10506 Throop St. New York, 30 Church St. Dallas, 1602 Praetorian Bldg. Charlotte, N. C., 501 Realty Bldg. Greenville, Pa., 110 Pine St. San Francisco, 461 Market St. Bridgeburg, Ont., Can., 110 Janet St.

Shops: Greenville, Pa. (Pittsburgh District) Chicago, Ill.

Canadian Shop: Bridgeburg, Ontario

Concrete Retaining Wall. Ben. F. Walters, Contr., Peoria, Ill.

Blaw Light Wall Forms

were used on this retaining wall. These forms are handled in less time than it takes to handle wood forms. Blawforms require fewer men and no skilled labor. They procure accurate results. They are adjustable for all kinds of work and are practically indestructible. These forms are both leased and sold.

There are a great many different types of Blawforms,—forms from sidewalks to skyscrapers, from sewers to subways. Tell us what you have to build and we will suggest the proper type of forms to use. **We can save you money,** why not give us a chance to prove this statement?

Blaw Steel Construction Co.

General Offices—Pittsburgh

New York Chicago

STRUTHERS-WELLS COMPANY

WARREN, PENNA.

Riveted and Welded Steel Plate Construction

New York Office: 50 Church Street

See our illustrated ad—in first issue of each month

The T. A. Gillespie Company

Engineers and Contractors Manufacturers of

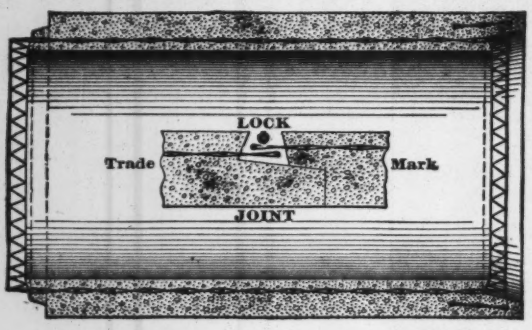
Lock-Bar and Riveted Steel Pipe

Pittsburgh, Westinghouse Bldg. New York, 50 Church St.

LOCK JOINT PIPE COMPANY

165 BROADWAY, NEW YORK CITY

Continuous Reinforced Concrete Pipe Patented



For Sewer, Waterworks, Intakes, Culverts, Etc. (Sizes 24 inch to 108 inch)

MERIWETHER SYSTEM

THE MERIWETHER SYSTEM provides for a continuous reinforced concrete pipe laid in sections, in which the joints between sections are so made as to insure freedom from leakage or obstacles to flow. By a simple "Lock Joint," the joints are equally as strong as the rest of the pipe. Thousands of feet laid each year in nearly every Province in Canada and State in the Union.

WRITE FOR ILLUSTRATED CATALOG

THE LOCK JOINT PIPE CO. NEW YORK, N. Y.

THE CANADIAN LOCK JOINT PIPE CO., Limited REGINA, SASK., CAN.

PACIFIC LOCK JOINT PIPE CO. TACOMA, SEATTLE, WASH.

GRAVITY and PRESSURE FILTERS

Hypochlorite Apparatus and Water Softening Plants.

LICENSEES
Pittsburgh Filter Mfg. Co.
Norwood Engineering Co.
Roberts Filter Mfg. Co.

THE NEW YORK CONTINENTAL JEWELL FILTRATION COMPANY

111 Monroe St., CHICAGO. Owners of the NEGATIVE HEAD FILTER PATENTS 15 Broad St., NEW YORK

GRAVITY FILTERS PRESSURE

For Municipal and Industrial Purposes.
Licensed For "Down Draft or Negative Head."

NORWOOD ENGINEERING COMPANY
FLORENCE, MASS.

NATIONAL TUBE COMPANY
PITTSBURGH PA.

American Pipe and Construction Co.
Water Works Engineers and Contractors
112 North Broad Street, Philadelphia
Also Manufacture
Welded Wrought Iron Pipe, Lined and Covered with Pure Cement and Having Lead Caulked Bell and Spigot Joints
The only noncorrosive pipe on the market good for any pressure.

THE "HOOKER" FIRE HYDRANT

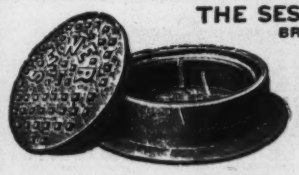
The "Hooker" is frost-proof with a dead air space between inside and outside case and sealed at the top and the bottom.

We also manufacture the "Hooker" sewer receiver—contractors' plows and castings. Handle light and heavy machine jobbing work.

Ask for descriptions and prices.

McKim Foundry and Machine Co., Lockport, N. Y.

Nicholas Engel
JOHN FOX & CO.
Cast-Iron Water, Gas and Flange Pipe
Special Castings, Fire Hydrants, Valves
General Foundry and Machine Work
253 BROADWAY NEW YORK CITY



THE SESSIONS FOUNDRY CO.
BRISTOL, CONNECTICUT
SEWER and SUBWAY MANHOLE CASTINGS
Sewer Catch-Basin Castings, Etc.
— TO ORDER —

TRADE **"LEADITE"** MARK

Registered U. S. Patent Office

A User Says:—

"Had very good success in using Leadite I used it on about ten miles of pipe. I figured that it saved me on the cost of material and labor at least 50%."

Leadite lessens labor; It fills every crevice from the yarn out to face of bell. No caulking required. The efficient water main joint.

Write for booklet. Specify Leadite.

"Leadite Joints Increase in Strength with Age."

THE LEADITE CO., Inc.,

LAND TITLE BUILDING **PHILADELPHIA, PA.**

CAST IRON PIPE

FOR

WATER—GAS—CULVERTS—SEWERS

SPECIAL DESIGN CASTINGS

UNITED STATES

Cast Iron Pipe & Foundry Co.

SALES OFFICES:

71 Broadway	New York City, N. Y.
1421 Chestnut St.	Philadelphia, Pa.
122 So. Michigan Boulevard	Chicago, Ill.
Henry W. Oliver Building	Pittsburgh, Pa.
James Building	Chattanooga, Tenn.
Monadnock Building	San Francisco, Calif.
Security Building	St. Louis, Mo.
Northwestern Bank Bldg.	Portland, Ore.

Cast Iron Pipe

Bell and Spigot—Flange

For 58 years we have been manufacturing the highest quality cast iron pipe and special fittings.

Send us your orders. Our large stock, always on hand, guarantees prompt shipment. Write.

Warren Foundry and Machine Co.

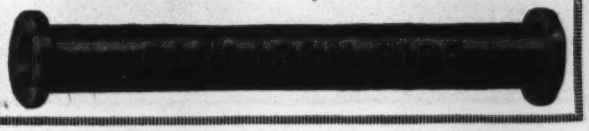
Sales Office: 11 Broadway, New York

Works: Phillipsburg, N. J.

New England Sales Agency: F. A. Houdlette & Son, 93 Broad St., Boston, Mass.

The following makers of Cast Iron Pipe and Fittings are independent of each other and competitors; inquiries may be sent to any or all of them with assurance of prompt and full service:

Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Lynchburg Foundry Co. Lynchburg, Va.
Massillon Iron & Steel Co. Massillon, Ohio
Standard Cast Iron Pipe & Foundry Co., Eristol, Pa.
American Cast Iron Pipe Co. Birmingham, Ala.
James B. Clow & Sons Chicago, Ill.
Donaldson Iron Co. Emaus, Lehigh Co., Pa.



UNIVERSAL PIPE

10" Universal Pipe at Clearfield, Pa.

Going into water with your Pipe Line?

USE

UNIVERSAL PIPE

BECAUSE

Water does not interfere directly or indirectly with the making up of the joints.

NO PACKING
NO GASKETS
NO CAULKING

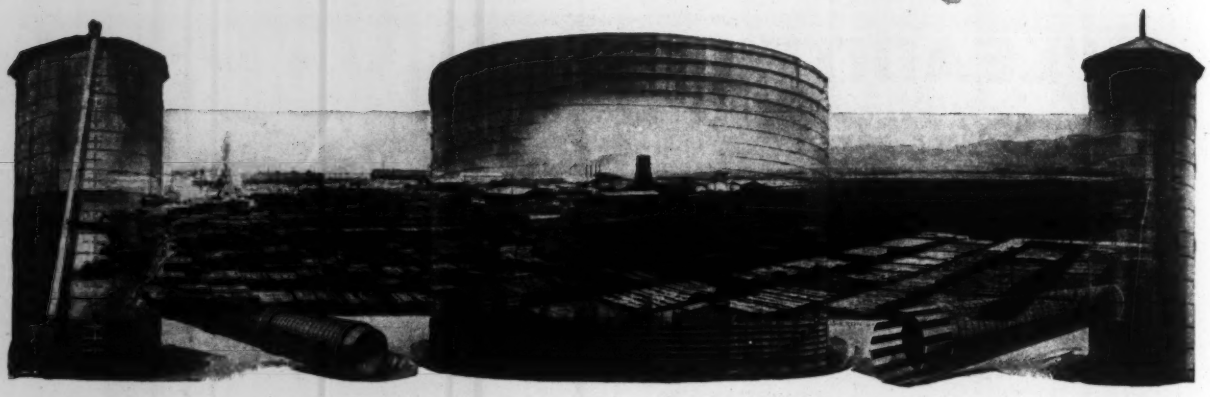
Nothing but iron itself. The contact of cast iron hub and spigot machined ends makes the joints tight.

See Sweet's Catalogue, Engineering Edition; or send for Catalogue U-B, and descriptive circulars.

U129

CENTRAL FOUNDRY COMPANY

NEW YORK



Our Factories and Lumber Drying Yards—Pittsburg, Cal.

TANKS

From 200 to 500,000 Gallons Capacity

For

Water or oil storage.
Mining and Metallurgical plants.
Acid-treatment processes.

PIPE

Continuous Stave—Machine Banded

For

Municipal Water Systems. Outfall Sewers.
Hydro-Electric Plants. Irrigation Systems.
Mineral Reduction Works. Chemical Works.

Both Tanks and Pipe Made from Strictly

Air-Dried Clear Redwood

a stock of forty million feet of which we maintain at our factory at all times. *Redwood* is immune from injury by acid or alkaline solutions, extremes of temperature or humidity, or insect attack. Life of *Air-Dried Redwood* in pipe and tank is 50 to 75 years. **Guaranteed for use in arid climates.**

Redwood Manufacturers Co., Dept. A. 805 Kohl Bldg. SAN FRANCISCO, CAL.

This Hand Book of Pipe Knowledge—

will be sent you FREE

One hundred and thirty-five pages of tables and data bound into a neat brown book—handy in size—conveniently arranged.

Tables of weights, theoretical spouting velocities, hydraulic elements of water-pipe conduits, units of storage and volume.

Squares, cubes, square roots, cube roots, logarithms, reciprocals, circumferences and circular areas of numbers from 1 to 1000.

Also a history of iron leading up to the discovery of the malleable iron process and a catalog of malleable iron shoes for continuous stave pipe.

We will send this Hand Book to engineers and hydraulic construction men in return for name, position occupied and address.

The Marion Malleable Iron Works
Marion, Ind., U. S. A.

Get Your Book of Piping Facts

An interesting treatise on piping difficulties. Compiled by experts—men who know every wrinkle of your troubles. Washington Wooden Stave Pipe is what you'll buy sooner or later—why don't you find out about it now?

Write for this book while you think of it—NOW.

WASHINGTON PIPE & FOUNDRY CO.
1512-1620 Center St. and 3001-3019 Asotin St., TACOMA, WASH.

WOOD PIPE

Takes Care of Increased Population

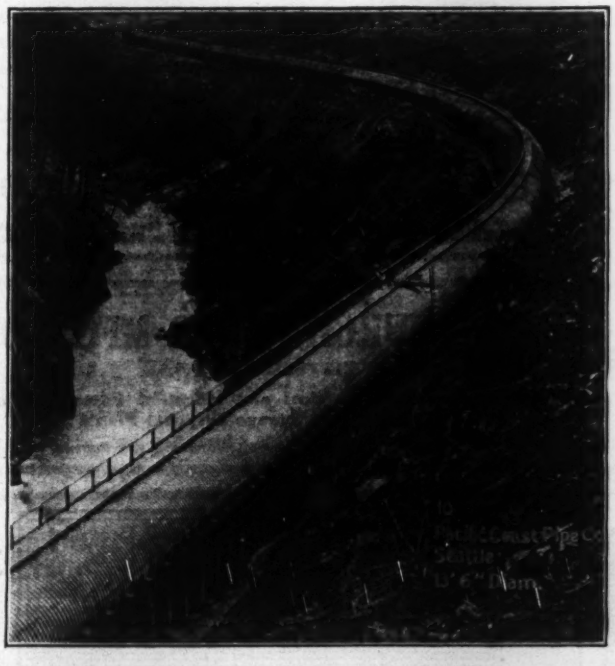
Machine banded or continuous stave wood pipe has greater carrying capacity than other pressure pipe. Time and use decreases the capacity of iron water pipe until replacement becomes necessary when increased population increases the consumption—the time when the system should yield profits to the municipality. Erosion, rust, etc., decrease the capacity of iron pipe by increasing friction. Wood pipe is preserved by water. The only effect age has upon its interior is to make the way of the water more smooth. Swift flowage is a guarantee of capacity, so much so that a smaller wood pipe will discharge as much water as a larger iron one.
You owe it to yourself to learn all you can about wood pipe. Our latest book "Wooden Pipe—Its Many Advantages" was compiled from the experience of engineers in making thousands of satisfactory economical installations—installations that you may want to make.

The book is free, send for it now.

PACIFIC TANK & PIPE CO.

Address Nearest Office
316 Market Street, San Francisco, Cal. 275 Oak Street, Portland, Ore. 410 Equitable Bank Building, Los Angeles, Cal.

The Largest In the World



This cut shows the largest continuous stave wood pipe ever built—installed for the Northwestern Electric Co., Stone & Webster Engineering Corporation Agents, on the White Salmon River, State of Washington.

The pipe is

13'-6" inside diameter and 1 mile in length

It conveys water to generate 16,000 h.p.—a most remarkable piece of work.

Why not place your orders for Wood Pipe with the Company actually making the largest and best installations?

We guarantee satisfactory performance under test.

We maintain an Efficient Engineering Department to help you solve your hydraulic problems. WRITE.

Pacific Coast Pipe Co.

Manufacturers of Machine Wire-Wound and Continuous Stave Wood Pipe
Seattle - Wash.

Winter Weather Does Not Bother the "Keystone" Contractor

Experience has taught him the many uses to which Keystone Explosives may be put during the freezing months. For instance—in blasting the frozen ground and excavating the stone-like earth "Keystone" proves itself to be a worthy addition to the working force of any contractor.

Its economy is at once apparent when it is appreciated that it makes possible work that would be otherwise long delayed.

The Keystone Booklet tells the method.

The Keystone National Powder Co., **Emporium, Pa.**

Wyckoff Wood Pipe

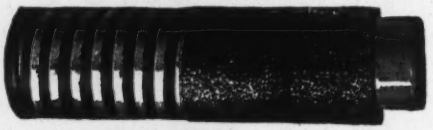
Built of Canadian Pine, wound spirally with insulated steel bands having a tensile strength up to 65,000 lbs. per sq. in. Absolutely proof against electrolysis. Cannot be destroyed by the extremes of temperature. Outlasts all metal pipes.

Write for details.

A. Wyckoff & Son Co., Elmira, N. Y.

Established 1885

Johnson-Peters Co., Pittsburgh Terminal Warehouse, Pittsburgh, Pa.
551 West 14th Place, Chicago, Ill.



The Rust proof Acid proof Burst proof Pipe

Michigan Combination Steel and Wood Pipe combines the strength of steel and the lasting qualities of wood. It will last. Withstands up to 200 lbs. pressure. We also manufacture Tin Lined Wood Casings for insulating underground steam and hot water pipes.

The Michigan Pipe Co., Bay City, Mich.

SLUICE GATES
Shear, Flap and Butterfly Valves
FLEXIBLE JOINTS
COLDWELL-WILCOX CO
NEW WINDSOR NEWBURGH N.Y.

Portland is the Perfect Pipe

Made of the finest old growth Oregon or Douglas Fir, Portland Wood Pipe is cheaper than iron or steel pipe yet of greater efficiency.

Portland Wood Pipe Co., Portland Oregon

SLUICE GATES, CHECK VALVES, INDICATOR POSTS, ETC.

GATE VALVES **EDDY** FIRE HYDRANTS

OUR LINE

Hydraulically and Electrically Operated Valves and Sluice Gates
Valves Designed for all Kinds of Service.

EDDY VALVE COMPANY, WATERFORD, N. Y.
New York Chicago Boston San Francisco Philadelphia

"RENSSELAER" VALVES
All Sizes
All Pressures
All Purposes

"COREY" FIRE HYDRANTS
Valve Boxes
Indicator Posts
Air Valves

RENSSELAER VALVE CO.

GENERAL OFFICES, TROY, N. Y.
NEW YORK, 189 Broadway CHICAGO, 1108-9 Monadnock Blk.
PITTSBURGH, 1016 House Building Seattle, 512 Colman Building

As 18-K is to the Jeweler,

The mark **DARLING** is to the Valve User The **BEST**

THE DARLING PUMP & MFG. COMPANY, Lim.

Box E Williamsport, Pa. A-12

PITTSBURGH FILTER MFG. CO.

PITTSBURGH, PA.

Contractors for Municipal and Industrial Filters, Water Softeners and Sewage Disposal Plants

Licensed Under Fundamental Negative Head Patents

WATERBURY WIRE ROPE

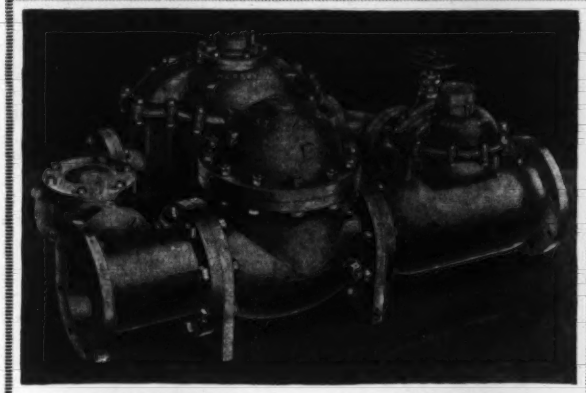
of Standard and Armored Construction. Manila and Sisal Cordage. Fibreclad Wire Rope. We make Ropes for every purpose. **Write for prices.**

WATERBURY COMPANY

80 South Street, New York
Chicago San Francisco Dallas
Boston New Orleans

WATER SOFTENING AND FILTRATION PLANTS

AMERICAN WATER SOFTENER COMPANY
1009 CHESTNUT ST. PHILADELPHIA, PA.
No affiliation or working agreement with any of our competitors



Safety First

USE THE HERSEY DETECTOR-METER ON FIRE SERVICES

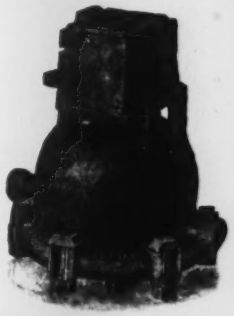
HERSEY MANUFACTURING COMPANY

Main Office and Works: South Boston, Mass.

Boston, Mass.: 714 Tremont Temple.
Philadelphia: "The Bourse."
Chicago, Ill.: 10 So. La Salle St.
New York City: 174 Fulton St.
Columbus, O.: 211 Schultz Bldg.
Buffalo, N. Y.: 806 White Bldg.
Atlanta, Ga.: 3rd Nat. Bank Bldg.
San Francisco, Calif.: 461 Market St.
Los Angeles, Calif.: Marsh-Strong Bldg.

"ALL KINDS OF METERS FOR ALL KINDS OF SERVICES"
500,000 SOLD

EMPIRE SUPERIORITY



THE LEADING WATER METER

UNRIVALLED FOR ACCURACY, DURABILITY, EFFICIENCY, LOW MAINTENANCE COST

NATIONAL METER COMPANY

84 CHAMBERS ST., NEW YORK

ESTABLISHED 1870 JOHN C. KELLEY, PRES.

CHICAGO BOSTON CINCINNATI PITTSBURGH
LOS ANGELES SAN FRANCISCO LONDON

PITTSBURGH METER CO.
Water & Gas
METERS
General Office & Works
EAST PITTSBURGH, PA.

Simplex Valve and Meter Company

Manufacturers of
WATER METERS for large pipes, Rate Controllers, Automatic AIR VALVES, REGULATING VALVES and HYDRAULIC APPARATUS of Special Design.

112 North Broad Street.....Philadelphia, Pa.

New England Representative—Geo. W. Stetson, 141 Milk St., Boston, Mass.
Canadian Representatives—Francis Hankin & Co., Montreal, Toronto and Vancouver, Canada.

"Let those now love, who've never loved before and those who always loved, now love the more."

LAMBERT

WATER METERS

Long Life.

Lasting Accuracy.

All parts interchangeable.

Maintenance cost nominal.

Their merits have made meter systems popular.

A good article is always worth the price.

All improvements which the tests of time and long service show to be requisite in a **Perfect Water Meter,** are embodied in the **Lambert.**

ONE MODEL ONLY

Made in all sizes ¾" to 6" of best bronze Composition throughout, fitted with Unbreakable reinforced disc-pistons.

Illustrated Price List on Application.

Address

THOMSON METER CO.

100-110 BRIDGE STREET BROOKLYN, N. Y.

SLUICE GATES

Operated by hand, electricity or water. Gates for every purpose and for all pressures of water.

Catalogue 12-A

The Hinman Hydraulic Mfg. Co.
1400 W. Colfax Ave., Denver, Colo.

A Handy Compressor
Simple Compressor
Strong Compressor

10½-inch Westinghouse Cross-Compound Compressor as used in building construction.

Westinghouse
Steam Driven Compressor

Handy, because being compact it can be readily moved about and set up almost anywhere, no prepared foundation is required. It can be attached to a wall, a post, the trunk of a tree, the boiler of a hoisting engine, or a movable stand is provided.

Simple, because of its few parts and the ease with which it is operated. No expert attendance is required.

Strong, because of its self-contained mechanical construction. It will withstand very rough handling without injury.

Westinghouse Steam Driven Air Compressors are made in both simple and cross-compound types.

SEND for our Compressor Book 9012.

Westinghouse Air Brake Co.
Pittsburgh, Pa.

New York City Investing Bldg. | Chicago Ry. Exchange Bldg. | St. Louis Security Bldg

These "Ingersoll-Rand" Bulletins Will Interest You

No. 3024 "Ingersoll-Rogler" Air Compressors
3030 Ingersoll-Rogler" Straight Line, Power Driven Air Compressors
3311 "Imperial" Duplex Steam Driven Air Compressors
3312 "Imperial" Duplex Power Driven Air Compressors

4202 "Sergeant" Rock Drills
4105 "Butterfly" Rock Drills
4020 "Leyner-Ingersoll" Water Drills
4007 Deep Hole Drill Wagons
4121 "Jackhamers"

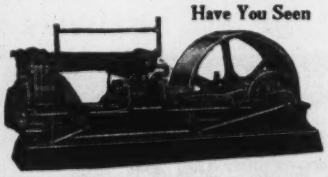
4122 Leyner Drill Sharpeners

9101 "Calyx" Core Drills

698 Riveters, Chippers, Rammers, Drill Hoists, Motors.

Which do you want? Check and return this list to us.

INGERSOLL-RAND COMPANY
11 Broadway, New York
—Offices the World Over.—



Have You Seen The Norwalk Motor-Driven Compressor?

Full Load, Part Load, No Load, according to demand. Don't be satisfied with the "as good" kind. Get "IT!"

The Norwalk Iron Works Co.
South Norwalk, Conn.

McKiernan-Terry Drill Co.

Manufacturers of
Rock Drills, Hammer Drills, Core Drills, Pile Hammers, Atlas Jacks.

234 Broadway, New York

Sullivan Test Borings

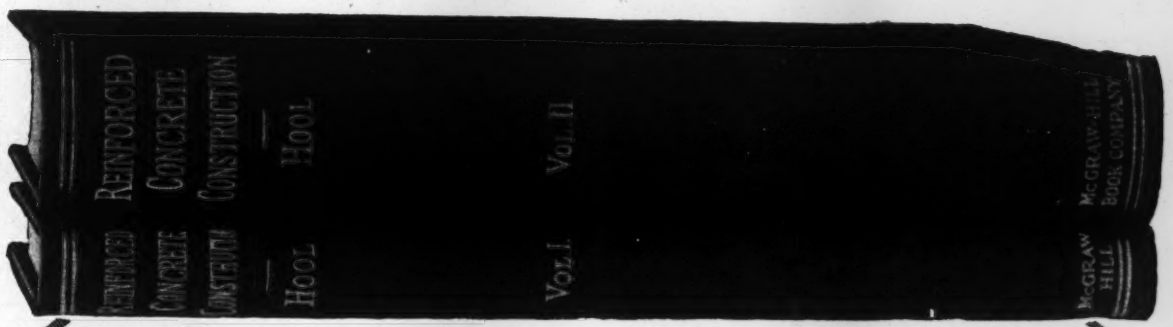
made with Sullivan Diamond Core Drills, will find bedrock for you quickly, accurately and cheaply.
Ask for prices per foot.

Sullivan Machinery Co., 122 So. Michigan Ave. CHICAGO

Wyoming-Mayari Shovels

The 21-pound-load shovel is made now from Mayari Steel, the sort of steel used in crank shafts. The result is more wear, infinitely. Look for the Red Edge—the identifying feature. May we send booklets?

WYOMING SHOVEL WORKS, Wyoming, Pa.



REINFORCED CONCRETE CONSTRUCTION

The Newest Books

Design of Sewers—Vol. I of American Sewerage Practice

By LEONARD METCALF and HARRISON P. EDDY, Consulting Engineers.

747 *pages*, 6x9, 328 *illustrations*, 72 *tables*, $5.00 (21*s*) *net*, *postpaid*.

A source book bringing together in a form convenient for ready reference the important principles of theory and rules of practice in the design and operation of sewerage works.

Structural Engineers' Handbook

Data for the Design and Construction of Steel Bridges and Buildings

By MILO S. KETCHUM, C.E., Dean, College of Engineering, University of Colorado.

896 *pages*, 6x9, *flexible leather*, 400 *illustrations*, 250 *tables*, $5.00 (21*s*) *net*, *postpaid*.

The Regulation of Rivers

By J. L. VAN ORNUM, C.E., Prof. of C. E., Washington Univ., and Consulting Civil Engineer; formerly U. S. Asst. Engineer.

404 *pages*, 6x9, *illustrated*, $4.00 (17*s*) *net*, *postpaid*.

Foundations of Bridges and Buildings

By HENRY S. JACOBY, Professor of Bridge Engineering in Cornell University, and ROLAND P. DAVIS, Professor of Structural and Hydraulic Engineering, West Virginia University.

603 *pages*, 6x9, *fully illustrated*, $5.00 (21*s*) *net*, *postpaid*.

Handbook of Formulas and Tables for Engineers

Compiled by CLARENCE A. PEIRCE, Instructor in Power Engineering in Sibley College, Cornell University, with Mathematical Sections by WALTER B. CARVER, Assistant Professor of Mathematics, Cornell University.

Flexible leather, pocket size, thin paper, 168 *pages*, *illustrated*, $1.50 (6/3) *net*, *postpaid*.

By GEORGE A. HOOL, Associate Professor of Structural Engineering, University of Wis.

Volume I—Fundamental Principles—254 *pp.*, 6x9, 88 *illustrations*, $2.50 (10/6) *net*, *postpaid*. Published July, 1912.

Volume II—Retaining Walls and Buildings—657 *pages*, 6x9, 412 *illustrations*, 34 *plates*, $5.00 (21*s*) *net*, *postpaid*. Published November, 1913.

These are the latest books on concrete.

They are **practical books**—details of construction that are of definite value in all concrete work.

They are, in reality, handbooks for the engineer, architect and contractor.

There are no books on the market today that compare with them for thoroughness and practical usefulness.

The reviews we quote here confirm this—*and they are modern reviews*.

ENGINEERING NEWS, December 18, 1913:

"Comes nearer being a complete exposition of the field than any other book on concrete."

ENGINEERING RECORD, December 20, 1913:

"The great amount of new data and descriptive detail will make it an invaluable reference work for engineers and all others interested in reinforced concrete construction."

RAILWAY ENGINEERING AND MAINTENANCE OF WAY, June, 1914:

"We can unhesitatingly say this is the best general volume on reinforced concrete.

"Mr. Hool has rendered another distinct service to the profession.

"It seems that we are at last getting some books which are worthy of the engineer's attention as well as the student's."

Sent on Approval—No Advance Remittance

We will send these books or any book published by the McGRAW-HILL BOOK COMPANY, Inc., to any subscriber to the ENGINEERING NEWS or any member of the American Society of Civil Engineers for ten days' free examination.

If you are not a subscriber to ENGINEERING NEWS or a member of the American Society of Civil Engineers, a reference will give you the same privilege.

No books sent on approval outside of the United States or to booksellers or agents.

McGraw-Hill Book Co.

Incorporated

239 West 39th Street, New York

London **Berlin**

Publishers of Books for Engineering News

FREE EXAMINATION COUPON

McGraw-Hill Book Company, Inc., 239 West 39th St., New York.

You may send me the following on 10 days' approval:

Hool—Reinforced Concrete Construction.

Vol. I. Fundamental Principles, $2.50 net.

Vol. II. Retaining Walls and Buildings, $5.00 net.

.....

I agree to pay for the books or return them postpaid within 10 days of receipt.

I am a regular subscriber to ENGINEERING NEWS.

I am a member of the Am. Soc. C. E.

Signed.....

Address.....

Reference..... E N 12-31

(Not required of subscribers to ENGINEERING NEWS or members of Am. Soc. C. E.)

John Wiley & Sons, Inc.

432 Fourth Avenue, New York

London: Chapman & Hall, Ltd. **Montreal, Can.: Renouf Pub. Co.**

Books Published in 1914

We list below the Civil Engineering Books we published during the past year. If you are interested in those on other subjects, let us know. Catalogues on various subjects will be sent on request.

Engineering Geology

By Professors **Heinrich Ries, Ph.D.**, Cornell University, and **Thomas L. Watson, Ph.D.**, University of Virginia.

This book has been discussed from the engineer's viewpoint, and includes the fundamental principles of geology which relate to engineering problems.

672 *pages*, 6x9, 225 *figures*, 104 *plates*. *Cloth*, $4.00 *net*.

The Miscroscopy of Drinking Water

Third Edition, Rewritten

By Professor **George C. Whipple**, Harvard University.

Serves as a guide to the water analyst and the water-works engineer, and interprets results in the light of environmental studies.

409 *pages*, 6x9, 74 *figures*. *Cloth*, $4.00 *net*.

Clean Water and How to Get It

Second Edition

By **Allen Hazen**, Mem. Am. Soc. C. E.

Deals with the means now used by American cities to secure clean water. Many important changes and new material have been added to this edition.

196 *pages*, 5¼x8, 18 *full-page half-tone illustrations*. *Cloth*, $1.50 *net*.

River Discharge

Third Edition

By **John C. Hoyt**, Mem. Am. Soc. C. E., and **Nathan C. Grover**, Mem. Am. Soc. C. E.

This work describes the instruments and equipment, and other installation, the methods of measuring stream flow, and many tables of value in connection with the use of water.

183 *pages*, 6x9, 38 *text figures*, 10 *plates*. *Cloth*, $2.00 *net*.

Text-Book on Railroad Surveying

By **G. W. Pickels**, and **C. C. Wiley**, University of Illinois.

Presents the essentials of the subject in simple, concise form, and gives modern practical methods only.

263 *pages*, 4¼x6¾, 99 *figures*. *Morocco*, $2.50 *net*.

A Practical Treatise on Sub-Aqueous Foundations

By **Charles Evan Fowler**, Consulting Civil Engineer, Mem. Am. Soc. C. E.

This book is written in a practical manner, and contains thirty-three chapters, treating every essential detail, making the book a remarkable range of practical foundation work.

814 *pages*, 6x9, 476 *figures*. *Cloth*, $7.50 *net*.

Foundations

By Professor **Malverd A. Howe**, C. E., Rose Polytechnic Institute.

Gives a brief survey of the whole subject, treating of the most up-to-date practice, including the most recent types of reinforced concrete footings.

110 *pages*, 6x9, 56 *figures*. *Cloth*, $1.25 *net*.

Strength of Materials

Second Edition

By **H. W. Murdock**, M. E., C. E., Irrigation Engineer, U. S. Dept. of Agriculture.

Many important changes have been made in this edition. An essential feature, also, is the inclusion of material on reinforced concrete.

352 *pages*, 5x7¼, 137 *figures*. *Cloth*, $2.00 *net*.

Mechanics of Materials

Eleventh Edition

By **Mansfield Merriman**, Mem. Am. Soc. C. E.

In this edition the subject of testing of materials is treated in a new chapter. New matter on influence lines, curved beams, springs, and moment of inertia is also given.

524 *pages*, 5½x8¼, 250 *figures*. *Cloth*, $4.00 *net*..

Surveying Manual

By **Howard Chapin Ives**, Professor of Railroad Engineering, Worcester Polytechnic Institute.

A special feature of this book is the forty pages of field notes, reproduced at the same scale as drawn.

296 *pages, illustrated*. *Morocco*, $2.25 *net*.

Mechanical Properties of Wood

By Professor **Samuel J. Record**, M. A., M. F., Yale University, Forest School.

The subject matter in this book has been made readily available to everyone interested in wood.

176 *pages*, 6x9. *Cloth*, $1.75 *net*.

Modern Tunneling

With Special Reference to Mine and Water-Supply Tunnels.

By **David W. Brunton**, Consulting Mining Engineer, and **John A. Davis**, Mem. Am. Inst. Min. Engrs.

Presents the modern practice in tunneling for mining and water-supply purposes. Includes tunnels for drainage, transportation or development.

450 *pages*, 6x9, 80 *figures*. *Cloth*, $3.50 *net*.

Free Examination. No Cash in Advance

If you have an account with us, or are a member of any National engineering society, copies of any of our books will be sent to you for ten days' free examination, no cash in advance. A reference will also extend this privilege.

At the end of the above time you are either to remit the purchase price, or return the books postpaid.

If remittance accompanies the order, and after an examination the books are unsuited to your needs, your money will be refunded providing the books are returned within ten days after their receipt.

Contracts to Be Let

Bids received until Jan. 12, 1915.

Cottages, etc. at Training School

Yorktown Heights, N. Y.

Sealed proposals for Construction, Heating, Plumbing and Electric work for Seven Cottages; for Construction work of Power House and Coal Pocket (this does not include boiler plant, plumbing or electric work) and for Water Supply System, for the New York State Training School for Boys, Yorktown Heights, N. Y., will be received by Mr. William B. Osgood Field, President of the Board of Managers of the New York State Training School for Boys, No. 2 West 45th Street, New York City, until Tuesday, January 12, 1915, at noon, when they will be publicly opened and read. Proposals shall be enclosed in an envelope furnished by the State Architect, sealed and endorsed, and shall be accompanied by certified check in the sum of 5% of the amount of bid for Construction, Heating and Plumbing work; in the sum of $150 for Electric work; in the sum of $1500 for Power House and Coal Pocket, and in the sum of $450 for Water Supply System. The contractors to whom awards are made will be required to furnish surety company bond in the sum of 50% of the amount of contract within thirty (30) days after official notice of award of contract, and in accordance with the terms of specifications Nos. 2098, 2192, 2193, 2194, 2099 and 2107. The right is reserved to reject any or all bids. Drawings and specifications may be consulted at the New York office of the Department of Architecture, Room No. 1224, Woolworth Building; at the Department of Architecture, Capitol, Albany, N. Y. Drawings and specifications and blank forms of proposal may be obtained at the Department of Architecture, Capitol, Albany, upon reasonable notice and upon the deposit of certified check in the sum of $10 made payable to the State of New York, for each division of the work, which check will be returned if plans and specifications are sent back in good condition to the State Architect, Lewis F. Pilcher.

Bids received until Jan. 20, 1915.

Fabius River Drainage District

MARION COUNTY AND LEWIS COUNTY
STATE OF MISSOURI

Sealed bids will be received by the Supervisors of the Fabius River Drainage District at the office of the Secretary, J. H. Best, Illinois State Bank, Quincy, Illinois, until 9.30 o'clock A.M., January 20, A.D., 1915, for the construction of the levees and ditches and diversion channels for the Fabius River Drainage District. There are about 2,000,000 cubic yards of ditch and channel excavation and levee fill. The work will be divided into seven principal sections and four small sections, each suitable for a contract unit.

For further information inquire of Harman Engineering Co., 144 Fredonia Avenue, Peoria, Illinois.

JACOB A. HARMAN,
Chief Engineer.

Peoria, Illinois, December 19, 1914.

Bids received until Jan. 18, 1915.

Tenders for Equipment

GREATER WINNIPEG WATER DISTRICT.

Sealed Tenders addressed to the undersigned will be received up to noon of Monday, January 18th, 1915, for the supply of gravel pit Excavation, Screenings, Elevating and Crushing machinery. Also for Locomotives and Cars for pit and for railway service.

Specifications and Form of Tender may be obtained and Form of Contract may be inspected at the offices of the District.

The lowest or any tender not necessarily accepted.

S. H. REYNOLDS,
Chairman of Commissioners.

Winnipeg, Man., 901 Boyd Building, December 14th, 1914.

Bids received until Jan. 21, 1915.

Building at State Hospital

Binghamton, N. Y.

Sealed proposals for Construction, Heating, Plumbing and Electric work for new building for Chronic Patients; for New Boiler, Stack, etc., at the Binghamton State Hospital, Binghamton, N. Y., will be received by the State Hospital Commission, Capitol, Albany, N. Y., until two-thirty p.m., Jan. 21st, 1915, when they will be publicly opened and read. Proposals shall be enclosed in an envelope furnished by the State Architect, sealed and endorsed, and shall be accompanied by a certified check in the sum of 5% of the amount of bid for Construction work; in the sum of $1250 for Heating work; in the sum of $500 for Plumbing work; in the sum of $250 for Electric work, and in the sum of 5% of the amount of bid for New Boiler, Stack, etc. The contractors to whom awards are made will be required to furnish surety company bond in the sum of 50% of the amount of contract within thirty (30) days after official notice of award of contract, and in accordance with the terms of Specifications Nos. 2100, 2114, 2115, 2116 and 2191. The right is reserved to reject any or all bids. Drawings and specifications may be consulted at the Binghamton State Hospital, at the New York Office of the Department of Architecture, Room 1224, Woolworth Building, and at the Department of Architecture, Capitol, Albany, N. Y. Drawings and specifications and blank forms of proposal may be obtained at the Department of Architecture, Capitol, Albany, N. Y., upon reasonable notice, and upon the desposit of certified check in the sum of $10.00 made payable to the State of New York, for each division of the work, which check will be returned if plans and specifications are sent back in good condition to the State Architect, Lewis F. Pilcher.

Dated Albany, N. Y., December 23, 1914.

LEWIS M. FARRINGTON,
Assistant Secretary.

Bids received until Jan. 12, 1915.

Northerly Portion Sec. 18 Main Sewer

PASSAIC VALLEY SEWERAGE COMMISSIONERS

Notice is hereby given that the Passaic Valley Sewerage Commissioners have designated Tuesday, the twelfth day of January, nineteen hundred and fifteen, at two o'clock in the afternoon, as the time they will meet at their usual place of meeting, Essex Building, Clinton Street, Newark, New Jersey, to receive proposals, in writing, for the construction of the NORTHERLY PORTION of SECTION 18 of the MAIN INTERCEPTING SEWER, in the City of Paterson, in the County of Passaic, in New Jersey.

Particulars that may enable Contractors to judge of the character of the work are given below:

APPROXIMATE QUANTITIES.
Northerly Portion of Section 18.

Item 1.—Earth Excavation and Refilling, in trench, for 45-inch concrete sewer.	2,920	linear feet.
Item 2.—Earth Excavation and Refilling, in trench, for 57-inch concrete sewer.	1,720	linear feet
Item 3.—Earth Excavation and Refilling, in trench, for 65-inch concrete sewer.	160	linear feet.
Item 4.—Rock Excavation, in trench	7,000	cubic yards.
Item 5.—Concrete Masonry, with Portland cement mortar, in place, in trench.	3,200	cubic yards.
Item 6.—Brick Masonry, laid with Portland cement mortar, including all appurtenant work	100	cubic yards.
Item 7.—Reconstruction of local sewers, including all appurtenant work and expense		lump sum.
Item 8.—Steel for concrete reinforcement, in place	1,000	pounds.

Drawings, form of contract and specifications, and blank form for proposal may be obtained at the Commissioners' office from William M. Brown, Chief Engineer.

The Commissioners reserve the right to reject any or all bids.

PASSAIC VALLEY SEWERAGE COMMISSIONERS.
JOHN S. GIBSON, Clerk.
November 17, 1914.

Bids received until Jan. 5, 1915.

Highway Work

Office of the State Commission of Highways,
Albany, N. Y.

Sealed proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at 1 o'clock p.m., Tuesday, January 5, 1915, for the improvement of Highways in the following counties:

Cattaraugus 2 highways (6.94; 0.44); Cayuga (Approx. length 4.58); Columbia (Approx. length 4.97); Delaware (Approx. length 3.90); Essex 2 highways (5.98; 10.15); Franklin (approx. length 0.22); Genesee 2 highways (3.88; 2.84); Monroe (approx. length 7.12); Putnam (approx. length 2.55); St. Lawrence (approx. length 8.35); Saratoga 2 highways (4.95; 4.55); Sullivan (approx. length 10.97); Ulster (approx. length 6.50); Washington (approx. length 5.33).

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the Division Engineers in whose division the road is to be constructed. The addresses of the Division Engineers and the counties in which they are in charge will be furnished on request.

The especial attention of bidders is called to "Information for Bidders" in the itemized proposal, specifications and contract agreement.

JOHN N. CARLISLE, Commissioner.

R. K. FULLER, Secretary.

DEPARTMENT OF THE INTERIOR, U. S. RECLAMATION SERVICE, Washington, D. C., December 9, 1914.—Sealed proposals will be received at the office of the United States Reclamation Service, Great Falls, Montana, until 2 o'clock p.m., January 12, 1915, for furnishing and erecting one highway and pipe bridge of two spans, each composed of three trusses 97 feet 6 inches long, for the St. Mary Storage Unit, Milk River Project, Montana. For particulars address the United States Reclamation Service, Washington, D. C., Great Falls, Montana, or Fletcher, Montana. A. P. DAVIS, Chief Engineer.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., December 18, 1914.—Sealed proposals will be opened in this office at 3 p. m., January 29, 1915, for the construction complete (including mechanical equipment, lighting fixtures, and approaches) of a one-story mezzanine and basement, stone and brick-faced building of 4600 square feet ground area, partly fire-proof construction, composition roof, for the United States post office at Chanute, Kans. Drawings and specifications may be obtained from the custodian at Chanute, Kans., or at this office, in the discretion of the Supervising Architect. O. Wenderoth, Supervising Architect.

U. S. ENGINEER OFFICE, Vicksburg District, Vicksburg, Miss., Dec 5, 1914.—Sealed proposals for building Dam No. 2, a lockmaster's dwelling, etc., on Ouachita River, at Harrisonburg, La., will be received here until 12 o'clock, noon, Feb. 5, 1915, and then publicly opened. Information on application. J. R. SLATTERY, Maj., Engrs.

Bids received until Jan. 16, 1915.

Steel Highway Bridge

Wawarsing, N. Y.

Sealed proposals for furnishing and erection of a steel highway bridge, span 197 feet, across the Rondout Creek, in the settlement of Wawarsing, Town of Wawarsing, County of Ulster, New York, will be received by the Town Board of said town, at its place of meeting, Town Hall, Ellenville, New York, on or before January 16th, 1915, at eleven o'clock A.M., in accordance with the plans and specifications on file in the office of J. F. Loughran, County Superintendent of Highways, 74 John Street, Kingston, N. Y.

The Town Board reserves the right to reject any or all bids if the best interests of the town will thereby be promoted.

A certified check of $400.00 required with proposal.

SILAS S. SHURTER,
Town Superintendent of Highways, Town of Wawarsing.

U. S. ENGINEER OFFICE, Wilmington, N. C., Nov. 21, 1914.—Sealed proposals for construction of breakwater including shore connection at Cape Lookout, N. C., will be received at this office until 12 M., Jan. 5, 1915, and then publicly opened. Information on application. H. W. STICKLE, Maj., Engrs.

U. S. ENGINEER OFFICE, Cincinnati, O., Dec. 26, 1914.—Sealed proposals for constructing Lock and Dam No. 33, Ohio River, near Maysville, Ky., will be received at this office until 2 p.m. (Central Time), January 26, 1915, and then publicly opened. Information on application. H. JERVEY, Lt. Col., Engrs.

PROPOSALS FOR CONSTRUCTING CONCRETE STOREHOUSE, Office Const. Quartermaster, U. S. A., Fort Warren, Mass., December 18, 1914.—Sealed proposals in triplicate will be received at this office until 12 o'clock noon, January 18, 1915, and then opened for furnishing all labor and materials for the construction of a Concrete Storehouse at Fort Strong, Mass. Full information furnished upon application. Deposit certified check, $5.00 required for plans. CAPT. H. T. MATTHEWS, Q.H.C., Const. Quartermaster.

U. S. ENGINEER OFFICE, CHICAGO, ILL., Dec. 19, 1914.—Sealed proposals for reconstructing with piles and timber, part of East Pier at Michigan City Harbor, Ind., will be received at this office until 10 A.M., Jan. 19, 1915, and then publicly opened. Information on application. W. V. JUDSON, Lt.-Col., Engineers.

DREDGING.—U. S. Engineer Office, 815 Witherspoon Bldg., Phila., Pa., Dec. 8, 1914.—Sealed proposals for dredging in Delaware River, below Philadelphia, will be received here until 12 noon, Jan. 7, 1915, and then publicly opened. Information on application. GEO. A. ZINN, Colonel, Engrs.

U. S. ENGINEER OFFICE, First District, New York City, Room 710, Army Building, 39 Whitehall Street, New York, N. Y., December 22, 1914.—Sealed proposals for Dredging in Hudson River Channel, N. Y., will be received at this office until 12 M., January 22, 1915, and then publicly opened. Information on application. W. M. BLACK, Col. Engrs.

Classified Advertising

Positions Wanted, 3 cents a word, minimum charge 50 cents an insertion, payable in advance.

Positions Open, (Civil Service Examinations), **Employment Agencies** (Labor Bureaus), **Business Opportunities, Wanted** (Agents and Salesmen—Contract Work), **Miscellaneous** (Educational—Books), **For Sale,** 5 cents a word, minimum charge $1.00 an insertion.

Count four words for keyed address care of New York; five for Chicago. Abbreviated words or symbols count as full words.

Copy should reach us not later than 10 A.M. Wednesday for that week's issue. Answers addressed to our care, Tenth Avenue at Thirty-sixth St., New York or 1144 Monadnock Block, Chicago will be forwarded (excepting circulars or similarliterature).

No information given by us regarding keyed advertiser's name or address. Original letters of recommendation or other papers of value should not be inclosed to unknown correspondents. Send copies.

Advertisements calling for bids, $3.60 an inch per insertion. N

POSITIONS WANTED

Mechanical and Electrical Engineers

MECHANICAL ENGINEER, 34, technical school and 12 years' broad experience, desires position, in or near New York preferred. P. W. 635, Eng. News.

MECHANICAL AND STRUCTURAL ENGINEER, 20 years' experience machine shop, erecting and drafting room, desires position with well established firm; best references. P. W. 657, Eng. News.,

Civil Engineers

CIVIL ENGINEER, twelve years' experience, desires position on civil, railroad or municipal work. P. W. 485, Eng. News, Chicago.

ENGINEER, 14 years' experience; surveys on railroad location and construction, irrigation, drainage, United States Geological, subdivisions, flood prevention and sewers. 1844 Millard Ave., Chicago.

CIVIL ENGINEER, eight years' experience desires position on railroad, municipal, structural, or construction work. Best references, can furnish instruments. P. W. 593, Eng. News.

CIVIL ENGINEER, age 34, graduate, 12 years' experience general survey and construction work on Eastern railroads desires position. P. W. 658, Eng. News.

CIVIL ENGINEER, university and technical graduate, age 31, married, 8 years' experience in railroad location and maintenance, irrigation and municipal engineering and construction. Position with engineers or contractors. Pittsburgh location preferred. Good references. Open Jan. 1. P. W. 650, Eng. News.

CIVIL ENGINEER; good technical education; six years' experience in field, drafting and design, timber, steel and concrete structures (specializing in reinforced concrete), tracks, yards and earthwork, on heavy railroad construction and Panama Canal. P. W. 664, Eng. News.

CIVIL ENGINEER; 10 years' experience, field and office, desires position; structural or reinforced concrete design and estimates: railroad or municipal. P. W. 670, Eng. News, Chicago.

BELGIAN ENGINEER, 30 years' experience installing equipment and managing power houses, machine shops, etc., throughout Europe, wants position in exporting house or preferably as superintendent or assistant with large contracting firm. P. W. 655, Eng. News.

Bridge and Structural

CHIEF DRAFTSMAN, charge 60 men, desires change; age 35; strong personal force; proved executive ability; 14 years' comprehensive experience. P. W. 520, Eng. News.

STRUCTURAL DRAFTSMAN; 6 years' experience checking and detailing shop drawings for buildings, bridges and industrial plants. P. W. 631, Eng. News.

Surveyors

INSTRUMENTMAN, 6 years' experience on location and construction. Age 28; speak Spanish. P. W. 647, Eng. News, Chicago.

INSTRUMENTMAN OR RODMAN, can do either; age, 22; four years' experience in railroad construction and location. P. W. 659, Eng. News.

Draftsmen

DRAFTSMAN, designer; steel, general construction, 15 years; experience in charge, immediately available, city. P. W. 669, Eng. News.

CHIEF DRAFTSMAN, charge 25 men, desires position; fully abreast of modern methods; proven executive ability; 15 years' varied experience; East preferred. P. W. 662, Eng. News.

Superintendents, Etc.

ENGINEER with eight years' field experience on municipal work, irrigation, state highway and railroad location and construction, will be open for position the first of the year, P. W. 640, Eng. News.

SUPERINTENDENT of building construction of broad experience, available January 1. References. Anywhere. P. W. 646, Eng. News.

HYDRAULIC AND MILL ENGINEER; 41, married, 20 years' experience; hydraulics, mill construction, operation and efficiency work. Disengaged, Jan. 1, prefers position with pulp and paper mill or power company. P. W. 649, Eng. News.

YOUNG MAN, labor agent licensed, greatly familiar with foreign laborers; speaks several languages. Can furnish best credentials. P. W. 652, Eng. News.

EXPERIENCED CONSTRUCTION ENGINEER, contractor's superintendent and business manager; graduate civil engineer; age, 30; good estimator, plant designer and executive; has superintended and managed contracts for the construction of sewers, concrete bridges, dams and retaining walls, road work, heavy wet excavation, etc., and just completed large, difficult section of Catskill Aqueduct; salary reasonable; A-1 references. P. W. 660, Eng. News.

ENGINEER; six years on railroad construction, bridges, buildings, dams, as designer, detailer, resident engineer, superintendent; opening wanted where ability, energy and results will lead to permanent opening. P. W. 663, Eng. News, Chicago.

ENGINEER desires position; locomotive, crane, excavator, derrick, ore hoist, etc., steam, electric. P. W. 661, Eng. News.

POSITIONS OPEN

ENGINEER-STENOGRAPHER; a young man familiar with engineering terms, preferably with engineering training or experience; for technical dictation and typewriting; advancement for right man; give references and qualifications in first letter. Morgan Engineering Co., Dayton, Ohio.

Civil-Service Opportunities

Competitive examinations for the civil-service positions named below will be held on or up to the dates given. For detailed information, write the United States Civil Service Commission, Washington, D. C., or other addresses specified.

ASSISTANT UTILITIES ENGINEERS—An examination for the above positions under the Illinois Public Utilities Commission will be held at points in Illinois on Saturday, Feb. 6, 1915. Minimum age, 21 years. Starting salary, $90 per month. Maximum, $125 per month. Open only to residents of Illinois. Application blanks must be filed by Jan. 30, 1915. For blanks and information, write State Civil Service Commission, Springfield, Illinois.

Employment Agencies

The Employment Agencies advertising in this paper agree to refund any registration fee on demand any time within the first six months when no position is secured.

ENGINEERING MEN in every line for available positions. Applicants and employers write, The Toledo Engineering Agency, Toledo, Ohio.

WANTED

TWELVE SECOND-HAND BRIQUETTE MOLDS and tensile testing machine. W. 671, Eng. News.

ADDRESS of James S. Hollowell, construction engineer, who lived in Philadelphia a year ago. Toledo Stone & Glass Sand Co., 221 Ohio Bldg., Toledo, Ohio.

ADDRESS of C. A. G. Weymouth, C. E. C. A. Phelps, 8 S. Dearborn St., Chicago.

MISCELLANEOUS

COMMERCIAL AND LEGAL SERVICE to contractors on government works, affording the benefit of 10 years' experience. R. D. Micou, Attorney, Home Life Bldg., Washington, D. C.

STUDENTS wanted in all schools and colleges to sell the "Gilson Slide Rule." Liberal proposition. Slide Rule and instructions, 50c. Clair Gilson, Niles, Mich.

BUSINESS OPPORTUNITIES

WANTED—To sublet about 500,000 cu.yd. dragline excavation to reliable party who is in position to do work at once. B. O. 656, Eng. News, Chicago.

FOR SALE

DRAWING INSTRUMENTS, single or sets slightly used, at 100% saving; also sliderules, books, etc. Garfield Supply Co., Germantown Ave., Philadelphia, Penn.

A Correspondence Course

of instruction and actual work in designing and estimating the costs

in Reinforced Concrete Engineering

This course has been prepared by a well-known Consulting Engineer after many years experience in such work, and it is essentially a course in "added experience."

For Engineers

Of the present membership, 93% are experienced engineers who are graduates of the best known technical schools in this country. An experienced Structural Engineer who has *completed* this course writes:

"The course in Reinforced Concrete as given by you is something which a man cannot obtain by himself from books, or at schools. It could only be obtained after years of experience in that line."

Membership limited, because of the *personal attention* given to all work submitted.

M 629, ENGINEERING NEWS

Classified List

Second Hand Machinery, Material and Equipment

For Sale—Exchange—Rent—Wanted

Items not otherwise marked list equipment for sale.

Rates: Less than 4 insertions 55 cents per line—4 to 11 insertions 50 cents per line—12 or more insertions 45 cents per line.

N

ADDRESSES

BECKWITH, J. S., 108 Park Way, N. S., Pittsburgh, Pa.
BRADEN, James C., 26 Cortlandt St., N. Y. City.
CONTRACTORS' Service Co., 50 Church St., N. Y. City.
DALLETT & CO., Harrison Bldg., Phila., Pa.
DOUGLAS, Geo. B., 29 Broadway, New York.
GIVIN Co., Herbert, 30 Church St., N. Y. City.
GRIMSHAW CO., Wm. B., Drexel Bldg., Phila., Pa.
HITNER'S Sons Co., Henry A., Philadelphia, Pa.
HOISTING Engine Sales Co., 120 West 32d St., New York.
HYATT, C. W., 93 E. Oneida St., Baldwinsville, N. Y.
LINES FLYNN Co., Inc., 30 Church St., N. Y. City.
MARINE Metal and Supply Co., 167 South St., N. Y. City.
MARYLAND Equipment & Supply Co., Baltimore, Md.
NEW RIVER Co., The, Macdonald, W. Va.
NEW YORK Dock Co., Ft. of Montague St., B'klyn, N. Y.
PIPE & Contractors Supply Co., 3 Dover St., N. Y. City.
SAMPSON Co., Geo. H., 13 Pearl St., Boston, Mass., and 42 B'way, N. Y. C.; or Winston & Co., Brown Station, N. Y.
SCHMIDT, Jr., & Co., C. G. A., Empire Bldg., Phila., Pa.
SHERWOOD, E. C., 50 Church St., New York, N. Y.
SOUTHERN Iron & Equipment Co., Atlanta, Ga.
STALLEY, G. T., Box 390, Cleveland, Ohio.
WHITNEY, O. R., 39 Cortlandt St., N. Y. C. (Cort. 6095).
WILSON, E. H. & Co., Arcade Bldg., Phila., Pa.

Most items are signed with only part of the advertiser's name. Complete names and addresses in alphabetical order will be found under the heading "Addresses."

AIR COMPRESSORS

2—Ingersoll-Rand, Cross Compound steam and air cylinders with Corliss valve gear 2500 cu. ft. capacity.—SAMPSON.

2—Ingersoll-Rand, Cross Compound Steam and Air Cylinders with Corliss valve gear 3300 cu.ft. capacity. Boilers and Condensers with this plant. All in good condition. Bargain.—SAMPSON.

1—4700 Cu. Ft. Rand B. B. 3 Compound Steam and Compound Air Compressor with Condenser.—SAMPSON.

Several second-hand air compressors, steam and belt driven, straight line and two stage of various sizes from 70 to 1300 cu. ft. capacities. Good condition.—SAMPSON.

1—22x22-13-¼x24, Sullivan, steam driven, class WB 2, straight line, 2 stage, cap., 1160 cu. ft., 1—24x24x30, McKiernan, class A, straight line, steam driven, cap. 1414 cu. ft.; 1—24x24-¼x30, Ingersoll, class A, steam driven, straight line, cap. 1223 cu. ft., 2—16x20-¼x16, Ingersoll-Sargeant, class H-1, duplex, steam driven, cap. 1540 cu. ft.—HITNER'S.

1 Blaisdell 16x10x10, 60 H.P., 342 cu.ft. First class condition. Theo. Smith & Sons Co., Jersey City, N. J.

Steam driven, 3 Laidlaw-Dunn-Gordon duplex 2-stage and 5 Norwalk tandem 2-stage.—NEW RIVER.

1120 cu.ft. Ingersoll-Rand XB-2 like new—belt driven; 179 cu.ft. Ingersoll NF-1—10x10x10.—MARYLAND.

BOILERS

5—250 H.P. B. & W., 150 lbs. steam. Horizontal return tubular, 2—72"x20', 1—78"x20', 1—72"x18', 1—72"x15', 1—72"x14', triple riveted, butt strapped, 125 lbs. steam.—HITNER'S.

150 H.P. horizontal tubular, Union, Atlas, Erie City, Keeler and West Point. Pressure up to 125 lbs.—NEW RIVER.

40, 50, 60 and 80 H.P. loco. type on skids.—PIPE & C. S. CO.

10—5' diam. x 18' 4" length overall, Horizontal tubular, tested to 125 lbs.—NEW YORK.

BUCKETS

One four leaf 1 yd. Orange peel.—PIPE & C. S. CO.

5—¾ cu. yd. standard clam shells.—STALLEY.

1—1 yd. Williams single line clam shell.—BECKWITH.

Orange peel—¾, 1, 1¼, 1½ yd. capacity; clam shell—½ to 3 yd. capacity.—GIVIN.

¾ yd. Hayward Orange Peel; ¾ yd. and ½ yd. Hayward Clam Shell.—MARYLAND.

2—½ yd. steel hoisting buckets.—HYATT.

CARS

[Standard Gauge]

A number of low price passenger coaches suited for camp cars.—WILSON.

12—12 yd. Oliver dump cars.—SCHMIDT.

[24" Gauge]

30 Koppel 36 cu.ft. Steel Cars.—MARYLAND.

CONDENSERS

2 Jet condensers and 2 pumps, together with one small engine for the condensers 12" diam. x 14" stroke.—NEW YORK.

CRUSHERS

Farrel Jaw, 15x9, with screen and engine.—MARINE.

National Jaw, 14x8, on wheels.—MARINE.

Gyratory, Nos. 8, 7½, 6, 5, 4, 3.—GIVIN.

1 No. 2 Climax on trucks with 15' elevator with 18 H.P. mounted Climax portable engine and boiler.—BECKWITH.

DERRICKS

1 Steel stiff leg, 70' boom; 1 steel guy, 70' boom, 25 tons cap.; 1 steel traveling, 45' boom.—GIVIN.

45 & 55 ft. Boom Terry & Tench Stiff Legs; 90 ft. Boom A. H. & D. Co. Guy; 45 ft. Beom All Steel Traveling Derrick—Mundy 3 drum engine and Boiler and steam swinger complete.—MARYLAND.

DREDGES

Hydraulic and dipper. Sale or charter.—GIVIN.

ELECTRIC LIGHTS

For sale at less than half cost. Sixty 300 C.P. D.C. 220 V. Nernst arc lamps, moon globes. In perfect running condition. Can be seen in use in our offices; $4 each. (Regular price, $9.50). Price includes drop lighting switch. Must sell as our voltage is 110 in new office. HILL PUBLISHING CO., 10th Ave. at 36th St., New York.

Most items are signed with only part of the advertiser's name. Complete names and addresses in alphabetical order will be found under the heading "Addresses."

ENGINES, GAS

1 8 H.P. Vertical Type Fairbanks with sub-base.—SAMPSON.

1—5 H. P. Mietz & Weiss.—PIPE & C. S. CO.

ENGINES, STEAM

2—600 H.P. 28" diam. x 48" stroke Buckeye, complete; 4 flywheels—weight 8 ton each—18' diam. x 42" face.—NEW YORK.

FEED WATER HEATERS

Several types, capacities up to 1200 HP.—NEW RIVER.

FIRE ENGINES

2 Fire Engines, condition, first class.—HITNER'S.

HAMMERS

1 No. 6 Arnott Hammer.—HYATT.

HOISTING ENGINES

Lidgerwood 10x12 D.D.D.C. side by side drums, 33" diam.—MARINE.

Lidgerwood, 5x8 D.D.D.C. with boiler.—MARINE.

12 Lidgerwood, Lambert and others. Also one 5 lever Stroudsburg 7x10 cableway engine. PIPE & C. S. CO.

2 Lidgerwood 14x18, D.C. 3-tandem drum, reversible link motion; 1 Lidgerwood, 10x12, D.C. S.D. reversible link motion; 1 Lambert, 10x12, D.C. D.D. with boiler; 2 Lambert, 8x10, D.C. D.D. with Mass. boilers; 1 Lambert 7x10, D.C. D.D. with boiler; 1 Mundy, 7¼x10, D.C. D.D. with boiler; 1 Mundy, 6¼x10, D.C. D.D. with boiler; 1 O. & S. 6¼x8, D.C. D.D. with boiler. 2 Lidgerwood, 60 H.P. D.D. and swinger d.c. hoists.—HITNER'S.

9x10 Lidgerwood 3 drum—8¼x10 Lidgerwood D.D. with or without boiler or swinger. Other sizes.—GIVIN.

1—7½ H.P. single drum electric hoist.—BECKWITH.

SEVENTY-FIVE hoists for immediate delivery.—HOISTING.

INJECTORS

2 Seller's—2" diam. for steam, 2" water and 2" discharge.—NEW YORK.

INSTRUMENTS, SURVEYING

Second-Hand Transits, Levels, etc. Bought, sold or exchanged. Send for list of Second-Hand Instruments. Get our prices before ordering. WILLIAMS, BROWN & EARLE, Inc., Engineering Supplies, Dept. E, 918 Chestnut St., Phila.

Gurley Lt. Mt. Transit V circ. with guard; reversion tel. level; ex. diag. eye piece; stadia; Ainsworth Solar; Cost $240. Good cond., repair perfect. $175.—R. F. GRAY, Lusk, Wyo.

1 "Sterling" Architects Wye level.—HYATT.

LOCOMOTIVES

[Standard Gauge]

1 Porter, Std. G., 30-ton, 12x18, saddle tank.—DOUGLAS.

1 24 ton 12"x18" four wheel Porter saddle tank. Will pass rigid inspection.—WILSON.

1 38 ton 12"x14" Climax geared locomotive. Thoroughly overhauled.—WILSON.

50 locomotives, Switch, Mogul, Consolidation, Ten Wheel and Saddle Tank types.—SOUTHERN.

Baldwin, 14x24, 4-driver, S. T., new this year.—DALLETT

2—40 ton switchers, overhauled.—CONTRACTORS S. CO.

11x16 Vulcan and 10x16 Porter 4 driver S. T.—MARYLAND.

[36" Gauge]

10 10x16" Porter, Davenport and Vulcans.—SOUTHERN.

5 9x14" Porters.—SOUTHERN.

2—10x16" Baldwins; excellent condition.—SCHMIDT.

9x14 Porter and 10x16 Baldwin.—BRADEN.

2—9x14 Baldwin saddle tank.—BECKWITH.

5—10x16 Vulcans, 1911-12.—CONTRACTORS S. CO.

9x14—10x16 cyl. Porter-Vulcan contractors' type.—MARYLAND.

1—Baldwin 10x16" 16 ton dinkey, sale or rent.—SHERWOOD.

[24" Gauge]

6x10 Porter, 6x10 Baldwin, 7x12 Vulcan, 7x12 Baldwin, all 4 driver saddle tank.—MARYLAND.

LOCOMOTIVE CRANES

4 and 8-wheel, 10, 15 and 20 tons capacity.—HOISTING MACHINERY Co., 48 Church St., New York City.

4 and 8 wheel 10 and 15 ton.—CONTRACTORS S. CO.

15-ton Browning, 4-wheel, S. G., 50' boom.—DALLETT.

1—7 Ton, 4 wheel, Industrial, 21' boom; 1—15 ton, 8-wheel Industrial, wrecking crane, 20' boom, goose neck.—HITNER'S

15 ton excellent condition, cheap.—STALLEY.

4 and 8 wheel, 10, 15, 20 and 25 tons capacity.—GIVIN.

Browning 15 ton No. 8—8 wheel type—45′ boom; Browning 10 ton No. 1—4 wheel type—40′ boom.—MARYLAND.

MIXERS (Asphalt and Concrete)

Hadsel 2 yd. Batch, with engine,—on channels.—MARINE.

Smith ¾ yd. Batch with engine,—on skids.—MARINE.

Foote (cont.) No. 3, 7½ H.P. motor D.C. on wheels.—MARINE.

Portable plant, complete capacity 300-600 yds. per day; rare bargain.—LINES FLYNN.

1 Continuous Foote with 10 H.P. d.c. motor direct connected; 3—¾ yd. and 2—½ yd. Ransomes with engines—on skids. Two No. 2½ Smiths with engines—on wheels.—PIPE & C. S. CO.

MOTORS, ELECTRIC

1—30 H.P. General Electric 220 v. direct current.—SHERWOOD.

PILING, SHEET STEEL

5000 pieces Lackawanna and Carnegie.—GRIMSHAW.

PIPE

All sizes. ½″ to 18″ with perfect threads and couplings. also larger sizes. Pipe cut to sketch. PIPE & C. S. CO.

PIPE MACHINES

Saunders, Williams, Stover; from ¾ to 8″.—PIPE & C. S. CO.

PUMPS

1 Cameron 3½x2x4 Steam pump.—SAMPSON.

1 No. 8, 1 No. 9, 1 No. 10 Cameron.—MARINE.

2 Davidson Simplex 9x9x11.—MARINE.

1 Worthington Duplex 6x4x6.—MARINE.

1 Worthington Duplex 10x6x10.—MARINE.

2 Snyder-Hughes Vacuum 10x14x12 Simplex.—MARINE.

1 No. 486 Emerson, 4″ suc., 3″ dis.—MARINE.

Piston and plunger, sizes up to 12x12x12.—NEW RIVER.

2 Worthington 1,500,000 gal. Horizontal, Duplex Power, 14″ diameter, 10″ stroke.—WATER & LIGHT COMMISSION, Fergus Falls, Minn.

1 Compound duplex vertical center packed plunger, circulating pump, size 21—34x19—24, capacity 3500 gallons, 24 hours.—HITNER'S.

2 Fire, Worthington Duplex, 14″ diam. x 20″ diam. x 12″ water end x 16″ stroke.—NEW YORK.

RAILS

24″ and 20″ industrial rail and turntables.—PIPE & C. S. CO.

30, 40, 45, 56, 60 and 70 lb. Relaying Rail.—MARYLAND.

16 and 20 lb.—24″ Gauge Portable Track.—MARYLAND.

Most items are signed with only part of the advertiser's name. Complete names and addresses in alphabetical order will be found under the heading "Addresses."

ROAD ROLLERS

10-ton macadam roller, at a bargain; condition fine.—F. S. 666, Eng. News.

[Wanted]

Tandem paving roller Send description and price to W. 667, Eng. News.

SEWER PLANTS

2—Complete Sewer Contractor's Plants, including compressors and locks.—LINES FLYNN.

STEAM SHOVELS

Marion, model 60, steam shovel.—SOUTHERN.

1 ¾-yd. revolving traction, rebuilt.—LINES FLYNN.

1 70-ton Bucyrus, 2½ yd. dipper; Thew "O."—BRADEN.

1 No. 0 Thew traction; new Feb., 1913.—SCHMIDT.

2—65 ton, Bucyrus, 2½ Yd. dippers, $3000 each.—HITNER'S.

50 steam shovels, all makes and sizes; some used only two months; rent or sale. Rare bargains. Everything sold is guaranteed.—CONTRACTORS S. CO.

Thew "0" traction, modern, high number.—DALLETT.

1 Model 0 Thew, built 1912, low price.—GIVIN.

1—⅝ yd. Marion-Osgood, sell or rent.—SCHMIDT.

1—Bucyrus, 18 B, traction revolving ⅞ yd.—GIVIN.

No. 0 Thew traction, ⅝ yd. dipper, 15 tons, heavy boom type First class condition. Will make price low for quick cash sale. —L. F. SEYFERT'S SONS, INC., 437 North Third St., Phila., Pa.

1—Model D 1909 Vulcan, in good repair; will do excellent work on dirt; shop No. 1427.—TOLEDO STONE & GLASS SAND CO., 221 Ohio Bldg., Toledo, Ohio.

Bucyrus 14-B—¾ yd. Traction 1914; Marion-Osgood MO-18 —¾ yd. Traction 1914; Marion Model 31 Traction—1914; Thew Model A-No. 1 Traction shop No. 739; Thew Model No. 0 Traction shop No. 470—cheap.—MARYLAND.

TANKS

2 car tanks, one 6300 gal. capacity, one 6000 gal. For further particulars address F. S. 665, Eng. News.

TRAVELING CRANES

1 15-ton electric 36′ 6″ span.—DOUGLAS.

One—with clam shell bucket, new and cheap.—WHITNEY.

TURBINES

2 Houston 44″ Vertical, with beveled gears, shafting, etc. —WATER & LIGHT COMMISSION, Fergus Falls, Minn.

Firm building good engineering specialties and desiring to acquire

European or Eastern Business

can make advantageous New York connection with party having technical ability, selling experience, and a complete office equipment.

Address W. 621, Engineering News.

DEAN STEAM PUMP

8—16—10—18 Complex Condensing Duplex Pumping Engine.
5½—8—7 Condenser. 3—2—3 Duplex Boiler Feed Pump.
48″ Horizontal Return Tubular Boiler.
For sale, in good condition.

Apply Superintendent, Mt. Auburn Cemetery, Cambridge, Mass.

HOISTING ENGINES

AT OUR E. ST. LOUIS WORKS

7½ x 12 MUNDY D. C. SKELETON HOIST
8½ x 12 LIDGERWOOD D. C. D. D. HOISTING ENGINE AND BOILER
½ YARD HAYWARD ORANGE PEEL BUCKET

ZELNICKER IN ST. LOUIS

FREE—OUR 84-PAGE BOOK OF BARGAINS

WESTERN

Earth and Stone Handling Machinery

Air Dump Cars—Hand Dump Cars—Spreader Cars—Scrapers—Road Machinery—Portable Rock Crushers—Dump Wagons—Elevating Graders. Wagon Loaders and Ditchers. Glad to send Catalogs.

Western Wheeled Scraper Co., Farnsworth Ave. Aurora, Ill.

FOR SALE Nine scows, various dimensions, derricks, pile driver leads, 600 tons Carnegie steel sheeting, wood piling, heavy bridge and dock timber, engines and boilers, miscellaneous contractors' equipment, ten steel bridges, 2-52′, 2-48′, 2-45′, 2-37′, 2-31′.

Address, EDWARD GRAY

Foot of Orleans St., Detroit, Mich.

FOR SALE

Air Reheaters	Tripods	Pumps
Blowers and Fans	Drill Columns	Saw
Buckets	Electric Locomotives	Steel Pontoon
Cars	Grout Machines	Spiral Pipe
Car Tipple	Man Locks	Wrought Iron Pipe
Rock Drills	Pile Hammer	Drill Steels
Elevators		

Apply to

Harold Carpenter, Resident Engineer, Astoria Light, Heat & Power Co., East 132nd St. and Locust Ave., New York City.

WE WILL RENT YOU WHAT YOU NEED IN CONTRACTORS' EQUIPMENT

We Carry Only High-Grade Serviceable Machinery IN GOOD CONDITION

Our equipment is regularly repaired at our own shops and we guarantee its mechanical condition. You can depend on it for any work you have in contemplation, big or little.

We also sell outright or lease with privilege of buying.

Our prices are low for the class of equipment we offer.

Write US Stating Your Requirements

UNITED STATES EQUIPMENT CO.
208 South La Salle St., Chicago, Ill.

Applying Standard Asphalt Binder "B," Wecquahic Park, N. J.

STANDARD Asphalt Binder "B"

Write for booklet and prices.

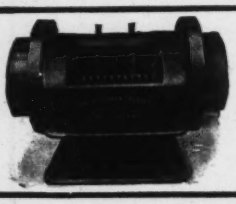
STANDARD OIL COMPANY
(New Jersey)
Baltimore, Md. Newark, N. J.

THE SICILIAN ASPHALT PAVING CO.
41 PARK ROW, NEW YORK

Sicilian Rock Asphalt Mastic Floors and Pavements for Hospitals, Cellars Kitchens, Breweries, Warehouses, Manufactories, Railroad Platforms, Sidewalks, Slaughterhouses, Stables, Etc.

Sicilian Rock Asphalt Street Pavements, Bermudez and Trinidad Asphalt Street Pavements

Particulars and Information upon Request.



BUCHANAN All-Steel Crushers
CRUSHING ROLLS — MAGNETIC SEPARATORS
Crushing Plants complete in all details from 100 to 5,000 tons daily capacity.
C. G. Buchanan Co., Inc.
Main Office: 90 West St., New York, N.Y.
Branch: 1218 Chestnut St., Philadelphia, Pa.

BACON FARREL
ORE & ROCK
CRUSHING WORLD KNOWN
ROLLS-CRUSHERS
EARLE C. BACON, ENGINEER
HAVEMEYER BUILDING, NEW YORK

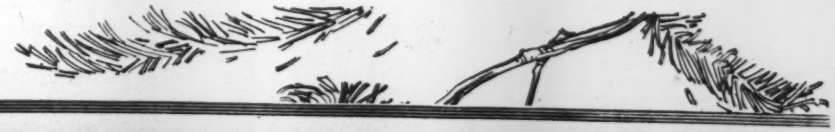
CONTRACTING ENGINEERS
STEEL AND MASONRY CONSTRUCTION
PIERS AND SHEDS COALING PLANTS
Cable Address, Santee New York. Western Union & Lieber Codes Used.
Cable Address, Pawnee Havana. Havana Office, Zulueta 36 D.
THE SNARE AND TRIEST COMPANY
Woolworth Building, 233 Broadway New York

The Marion Steam Shovel Co.
Builders of Railroad and Revolving Type Steam and Electric Shovels, Dipper, Elevator and Hydraulic Dredges, Scraper-Bucket Excavators, Ballast Unloaders, Railroad Ditchers and Log Loaders.
Station M, Marion, Ohio, U. S. A.
New York Office, 50 Church Street.

THE PENN COUPLER

OUR latest development of the M. C. B. Coupler, a modification of our popular Pitt and Janney "X" Couplers, with latest improvements. "Lock-to-the-Lock," "Lock-Set" and "Knuckle-Opener." Send for blueprints and prices.

Manufactured only by
THE McCONWAY & TORLEY CO., Pittsburgh, Penna.



"Every Pound Pulls"

A NEW BAR FOR THE NEW YEAR

CONCRETE STEEL COMPANY takes pleasure in presenting to the public the

HAVEMEYER FLAT BAR

which it is now ready to furnish.

This new deformed section is rolled to the same weights and areas as standard size plain flats. For some types of reinforced concrete construction, it is much more economical than the familar square and round sections.

For 1915, HAVEMEYER BARS will be rolled in ROUNDS, SQUARES and FLATS.

Full information on request.

CONCRETE STEEL COMPANY

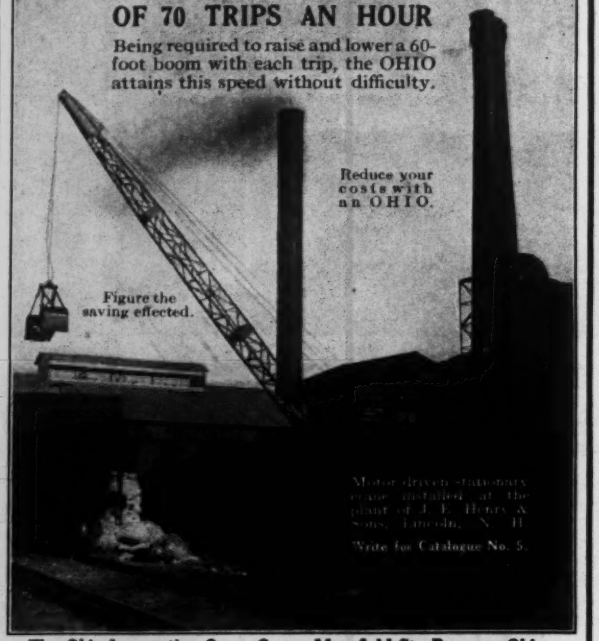
32 BROADWAY, NEW YORK

Chicago Boston Youngstown Philadelphia Syracuse

Fabricating Shops and Warehouses:
Youngstown Philadelphia New York

A REMARKABLE SPEED OF 70 TRIPS AN HOUR

Being required to raise and lower a 60-foot boom with each trip, the OHIO attains this speed without difficulty.



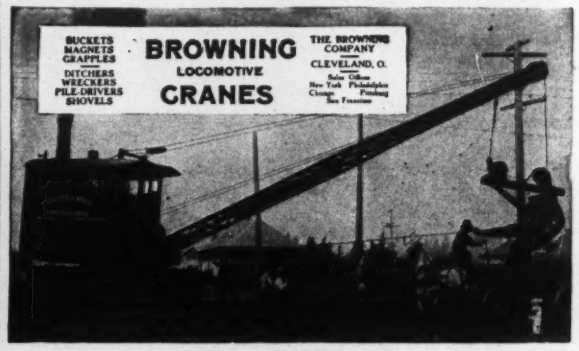
The Ohio Locomotive Crane Co., Mansfield St., Bucyrus, Ohio.

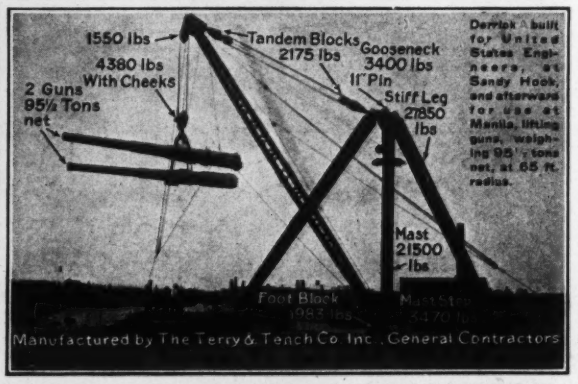
30 Church St., New York
Fisher Bldg., Chicago
Home Life Bldg., Washington, D. C.
Oliver Bldg., Pittsburgh
Edward R. Bacon Co., San Francisco—Los Angeles
Contractors Equipment Co., Seattle—Portland
N. C. Walpole Birmingham, Ala.
Industrial Engineering & Mchy. Co., Montreal
Dominion Equipment & Supply Co., Winnipeg

BUCKETS MAGNETS GRAPPLES — DITCHERS WRECKERS PILE-DRIVERS SHOVELS

BROWNING LOCOMOTIVE CRANES

THE BROWNING COMPANY CLEVELAND, O.




1550 lbs
Tandem Blocks 2175 lbs
Gooseneck 3400 lbs
11" Pin
Stiff Leg 27850 lbs
4380 lbs With Cheeks
2 Guns 95½ Tons net
Mast 21500 lbs
Foot Block
Derrick built for United States Engineers, at Sandy Hook, and afterward for use at Manila, lifting guns, weighing 95½ tons net, at 65 ft. radius.
Manufactured by The Terry & Tench Co. Inc., General Contractors

Don't Let Repair Bills Eat into Your Profits

They surely will if you specify inferior equipment in hoists and derricks for your jobs. Insure sure, rapid handling with

DOBBIE

Derricks and hoists which have been the standard for a generation.

Write and get full Dobbie details.

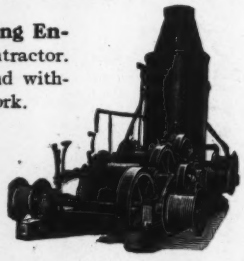
Dobbie Foundry & Machine Company
Niagara Falls, New York

Branch Stores, Pittsburgh and New York.
C. T. Patterson Co., New Orleans, La. Geo. B. Carpenter & Co., Chicago.

Improved Patent Swinging Attachment on the Flory Contractor's Hoisting Engine

This feature of the **Flory Hoisting Engines** will be of interest to every contractor. The friction is easy to handle and withstands a great amount of hard work.

Fully described in our new Catalog No. 25. Send for a copy NOW.



S. Flory Mfg. Co.
Bangor, Pa.

THE "AUSTIN" LINE OF MACHINERY

Gyratory and Jaw Rock Crushers
Horse Drawn and Motor Road Rollers
Street Sprinklers and Sweepers
Elevating Graders and Dump Wagons
Road Graders and Scarifiers

AUSTIN MFG. CO., NEW YORK CHICAGO

CANADIAN AGENTS: MUSSENS LTD., MONTREAL

LIDGERWOOD HOISTS

Steam — Electric

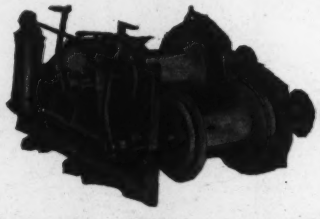


Illustration shows electric double drum hoist, one of the many types of contractors hoists built with electric or steam drive.

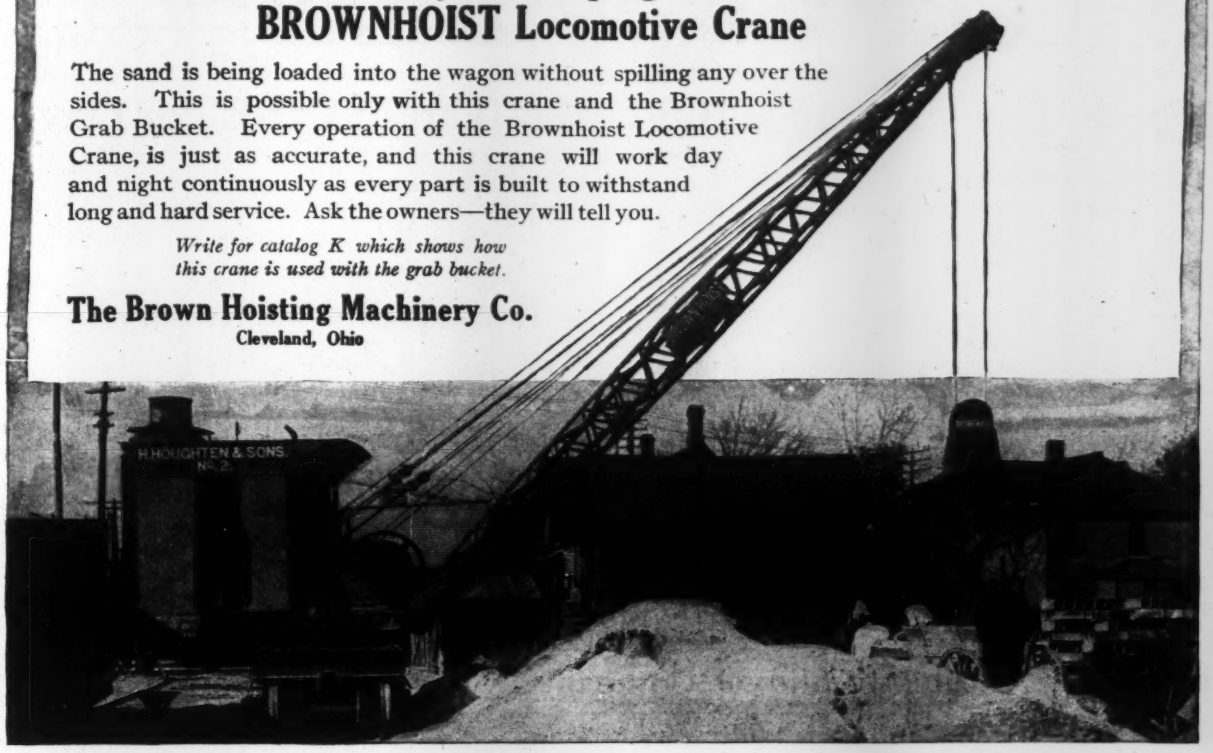
LIDGERWOOD MFG. CO., 96 Liberty St., NEW YORK

Note the accuracy of dumping sand with this BROWNHOIST Locomotive Crane

The sand is being loaded into the wagon without spilling any over the sides. This is possible only with this crane and the Brownhoist Grab Bucket. Every operation of the Brownhoist Locomotive Crane, is just as accurate, and this crane will work day and night continuously as every part is built to withstand long and hard service. Ask the owners—they will tell you.

Write for catalog K which shows how this crane is used with the grab bucket.

The Brown Hoisting Machinery Co.
Cleveland, Ohio



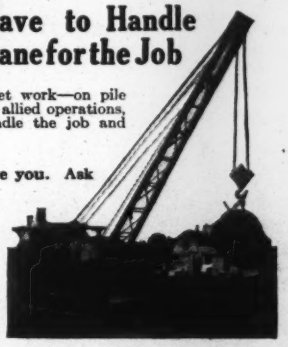
Whatever You Have to Handle There's an O.-S. Crane for the Job

Locomotive crane or grab bucket work—on pile driving, drag line excavating and allied operations, we build the equipment to handle the job and handle it right.

Bulletin No. 9 will convince you. Ask for a copy now.

Orton & Steinbrenner Company

Main Office: Chicago, Ill.
Works: Huntington, Ind.



Industrial Works Locomotive Cranes

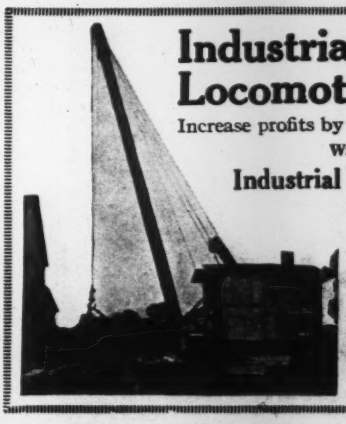
Increase profits by decreasing handling costs.

Write for a catalog.

Industrial Works, Bay City, Mich.

Wrecking and Locomotive Cranes from 5 to 150 tons Capacity—Portable Rail Saws—Transfer Tables—Freight Station Cranes — Pile Drivers — Grab Buckets — Lifting Magnets.

SALES AGENCIES — GEORGE M. NEWHALL ENGINEERING CO., Philadelphia, 50 Church St., New York, and Pittsburgh. J. G. MILLER, St. Louis. C. B. DAVIS ENGINEERING CO., Birmingham. F. H. HOPKINS & CO., Montreal.



LINK-BELT CRANES

FOR DEPENDABLE SERVICE

A Link-Belt Crane is an all-around machine for general work around any plant. It may be arranged to handle hook block, self-filling grab bucket, drag line bucket, electric lifting magnet, or equipped with special boom for steam shovel attachment and pile

LINK-BELT COMPANY
PHILADELPHIA, CHICAGO
NEW YORK

Traveling Cranes

For Power-House and every service. Electric and hand-power. Clearance diagrams and other information for initial layouts gladly furnished to engineers on request. Send for catalog.

We make Tainter Gate Hoists

Complete Foundry Plants

WHITING FOUNDRY EQUIPMENT CO
HARVEY, ILL. U.S.A.

Cranes of All Kinds

THEW SHOVELS

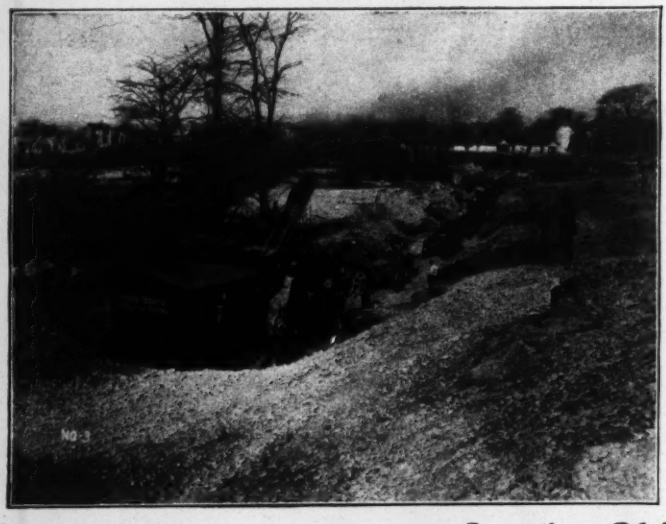
FULL CIRCLE SWING · THEW · HORIZONTAL CROWDING MOTION · STEAM SHOVELS

Type O Thew Averages Over 600 Cubic Yards Per Day

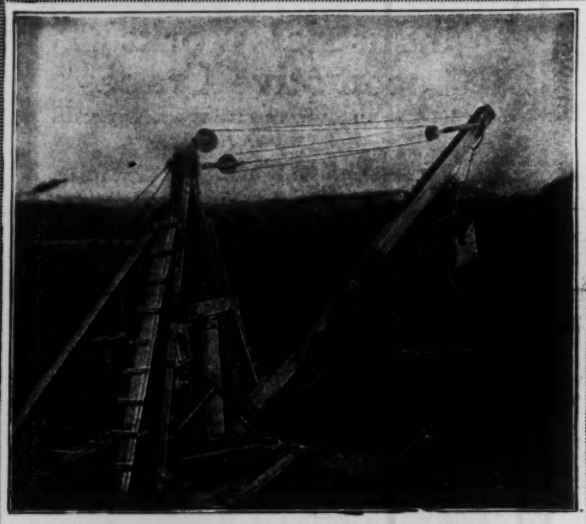
The Type O Thew Shovel on the job herewith illustrated handled a yardage of over 50,000 in the 82 ten-hour days during which it operated.

Thew Shovels on both large and small contracts are constantly proving their worth. The *full circle swing* and the *horizontal dipper crowding motion* are two features of **Thew Shovels** that help make them so popular with contractors. There are over 1100 **Thew Revolving Shovels** in operation, some of them near you.

Send for our descriptive catalog and list of **Thew** owners in your vicinity.



The Thew Automatic Shovel Company, Lorain, Ohio



A Complete "Union" Excavator Working in a Sand Pit

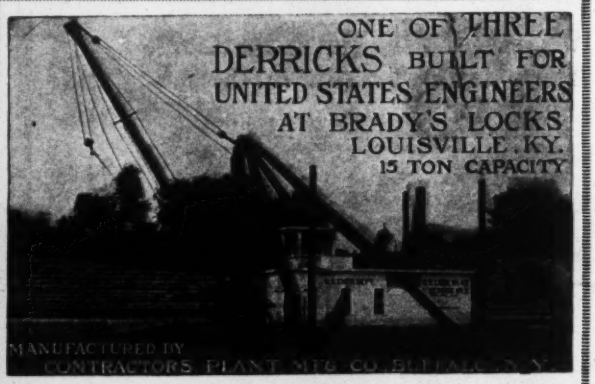
This is one of the instances where the contractor took advantage of our engineering department, which designs and builds special equipment to meet special needs.

It's a Union ½ Yard Excavator working in a sand pit for Leonardo Suzio, of Meriden, Conn.

The Union Derrick Attachment converts any derrick into an efficient excavator. **Write for the "Union Book" for details.**

Union Iron Works, West Shore Station Hoboken, N. J.

Manufacturers of Pile Driving Machinery and Contractors' Equipment.



Parsons Trench Excavators
for excavating
Sewer, Water and Gas Main Trenches
Send for our latest Catalog
The G. W. Parsons Co., Newton, Iowa

TRENCH MACHINES
We sell and lease All Kinds of Hoisting and Conveying Machines for Trench Work.
Catalog Sent Upon Request.
Carson Trench Machine Co., Boston, Mass.
BRANCH OFFICES: Rose Bldg., Cleveland; 348 St. James St., Montreal

HAYWARD BUCKETS

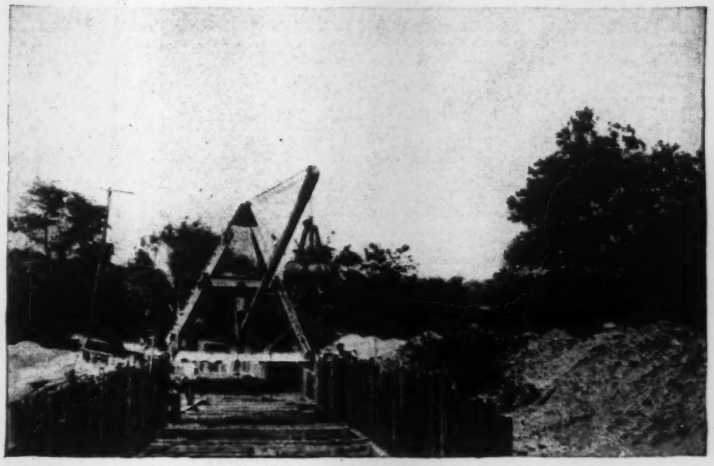
CUT THE COST of DIGGING SEWERS

Hayward Buckets may be operated by most any type of machine having one or more drums available for bucket work.

They will dig anything from soft mud to blasted rock.

There is a Hayward Bucket built for every kind of digging. If the most called for sizes, which we carry in stock, will not meet your requirements we will build you a Special Bucket that will.

Catalogues and Pamphlets showing them in operation sent upon request—send for them—today.



THE HAYWARD COMPANY

50 CHURCH STREET **NEW YORK, U. S. A.**

1½ YARD BUCKET GIVES "2 YARD" SERVICE

By attaching light pieces of sheet iron to each end of this bucket its users handled **one-half yard more material every trip.** An increase of output which amounted to **200 Cu. Yds. daily.** Another case of "two-yard" service with a 1½-yard

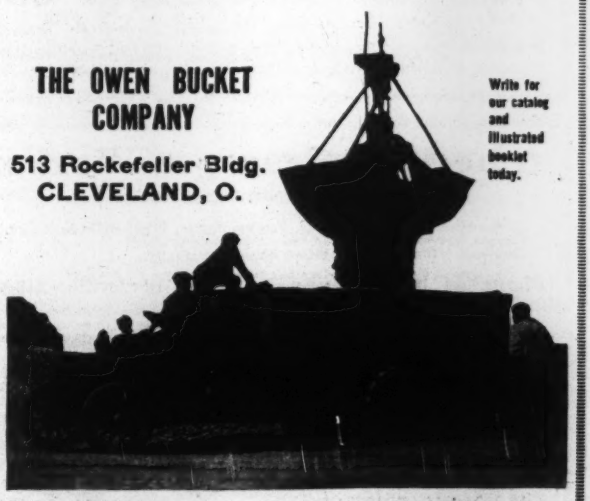
OWEN BUCKET

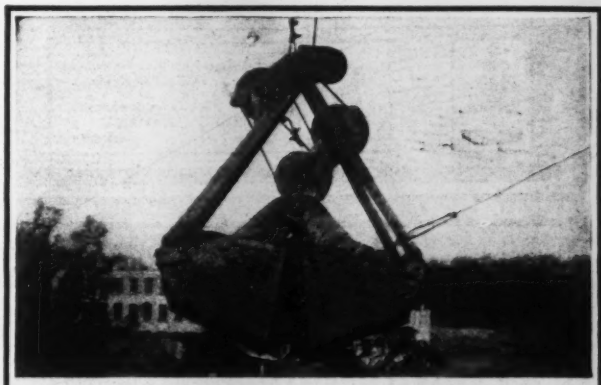
Two trips of this bucket fills this five-ton truck with 2 in. Trap Rock. Time consumed: One minute. It is to your advantage to learn why you can expect this kind of service of an Owen Bucket when used for rehandling materials of all kinds in large quantities.

THE OWEN BUCKET COMPANY

513 Rockefeller Bldg.
CLEVELAND, O.

Write for our catalog and illustrated booklet today.





Excavating at Belleville

Excavating costs on the Belleville section of the Passaic Valley Sewer were brought down to the lowest possible costs by the Cauldwell, Wingate Co. by using this 1 yd. Hercules pattern

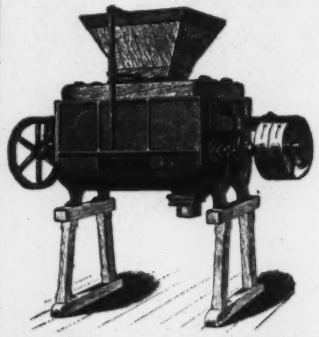
Williams Bucket

Unexcelled in efficiency and reliability. The full rated capacity is picked up with every grab. Built entirely of steel with bronze bushed sheaves. The power lever closing mechanism requires only 1½ turns of the large main shaft for complete closure.

Our engineering department will gladly help you select the right bucket. Send for that "Bucket Book" today.

The G. H. Williams Company
1513-1515 Rockefeller Bldg. **Cleveland, Ohio.**

High Speed Cement Mixers of All Capacities



The Broughton Dry Mixers meet every output requirement.

The capacities range from 8 tons to 50 tons per 10 hour day. All bearings are self-oiling and placed outside the case so that material does not come in contact with them.

All parts are substantially built to stand the wear without the usual repair tie-ups.

Send for Catalog No. 1.

Alexander Iron Works
Syracuse, N. Y.

WOOD PRESERVING

PILING—TIMBERS
TIES—WOOD BLOCKS

Your Specifications or Ours — Correspondence Solicited
THE BARBER ASPHALT PAVING CO., Maurer, N. J.

IN USE A QUARTER OF A CENTURY

Dragon
PORTLAND CEMENT

THE LAWRENCE CEMENT CO.
1 Broadway
New York

PROMPT ATTENTION GIVEN TO EXPORT ORDERS.

NAZARETH CEMENT CO. — NAZARETH — PORTLAND CEMENT — WORKS NAZARETH, PENNA.

SALES OFFICES:

New York,	1270 Broadway
Boston,	John W. Ramsay, N. E. Rep't 161 Devonshire St
Philadelphia,	621 Arcade Building

Kyanizing? Yes!
Kyanized timber is the best building material, and be sure it is B. M. Co's Kyanized Spruce. That's a guarantee.
BERLIN MILLS COMPANY
Portland Maine

WHY Avenarius CARBOLINEUM PRESERVES WOOD EVERYWHERE

Simple methods—known costs—explained in new special circular—get it. Avenarius Carbolineum prevents decay of wood. Doubles life of timber. Costs 1/2 to 2c. per sq. ft.—$5 to $12 per 1000 ft. B. M. Applied by brush, spray or open tank. 37 years' continuous service. Depots everywhere.

CARBOLINEUM WOOD PRESERVING CO.
181 Franklin St. New York — 312 Prairie St. Milwaukee — 161 Front St. Portland, Or.

Barrett's Grade One LIQUID Creosote Oil

Will Cut Your Wood Preserving Bills in Half

Write for Booklet.
Barrett Mfg. Co.
New York
Branches in Principal Cities

TRADE B MARK

E. A. Buell, President. Bdm. Christian, Eng. and Gen. Mgr.
Percy A. Smith, Asst. Mgr.

NORFOLK CREOSOTING CO.

Citizen's Bank Building, NORFOLK, VA., U. S. A.

A MODERN PLANT Adapted to Filling the Most Rigid Specifications
Send for Descriptive Book—Spanish or English

Office: 50 Church St. New York City — **THE WYCKOFF PIPE & CREOSOTING COMPANY** — Works: Portsmouth Virginia

Established 1881

Manufacturers of Creosoted Railroad Ties, Bridge Timbers, Piles, Poles, Paving Blocks, Cross Arms, Wood Pipe and Steam Pipe Casings and Wyckoff Conduit for Underground Wire. **Send for Catalogue B.**

American Creosote Works,

New Orleans, La. (Station B)

Creosoted cross arms, Lumber, Paving Blocks, Piles, Poles and Ties.
Private free wharf for ocean vessels at New Orleans.
Capacity 100 million feet board measure annually.

Plants at New Orleans, La., and Louisville, Miss.

The Enormous Waste of Timber
which takes place in this country every year
Can Be Stopped by Proper Treatment

Coal Tar Creosote is the most effective means. We have been manufacturing treated timbers by this method for 17 years. We know how. Take advantage of our service. Write today.

Republic Creosoting Co., General Offices, Indianapolis, Ind.
Established 1896
Branch Offices and Plants: Indianapolis, Minneapolis, Mobile.

We manufacture and can ship immediately Creosoted Ties, Paving Blocks, Bridge Timbers, Piling Dock Timber, Mining Props, etc., etc. Our Service Department is at your disposal.

LETTENEY IS LASTING

1867 — WOOD LETTENEY PRESERVATIVE — **1914**

The oldest high boiling Coal Tar Wood Preserving Oil on the market.

Large or small lots shipped promptly.

THE NORTHEASTERN CO., BOSTON, MASS.

Concrete for permanence

Living Rock!

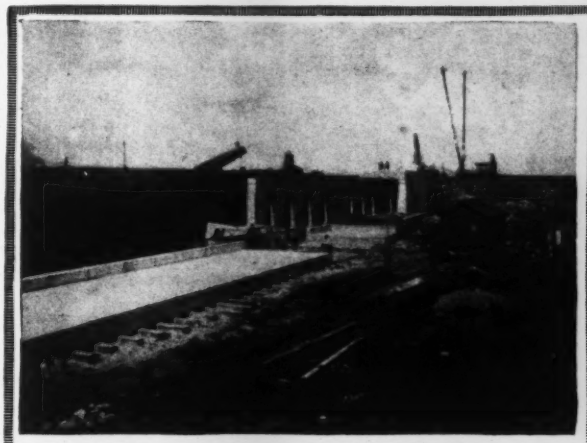
plastic at your wish—eternally hard at your direction—that is Atlas Portland Cement, valued wherever cement is known as "the standard by which all other makes are measured."

EVERY BAG ALIKE
Output 4,000,000 Bags Annually
DEXTER PORTLAND CEMENT
The Exceptional Standard
SOLE AGENTS
SAMUEL H. FRENCH & CO., PHILADELPHIA

See Page 152-153 in "Sweet's" for Full Particulars
ALSEN CEMENT
Concrete Roads Mean Permanent Roads.
The new necessity.
Over 1,000,000 Barrels for Ashokan Dam

BUY THE BEST
Old Dominion Portland Cement
Works—Fordwick, Va.
Penn-Allen Portland Cement
Works—Penn-Allen, Pa.
Phoenix Portland Cement
Works—Nazareth, Pa.
Wm. G. Hartranft Cement Company, Sole Selling Agent, Real Estate Trust Bldg., Philadelphia, Pa.

Ironton Portland Cement Co.
Ironton, Ohio
Mfrs. of
A Light Colored Portland Cement
Especially desirable for light shade concrete.
Used on numerous government dams in Ohio River.
12th year of successful production.
Shipping facilities, four railroads and Ohio River.



New Departures

are constantly being made in the engineering world. More rapid, less expensive, more permanent types of construction are always being developed.

The unit method of construction now being adopted by some of our leading railroads for much of their work eliminates the necessity of the usually cumbersome aggregation of concrete mixing and pouring machinery, and is particularly handy for winter work.

Concrete's the Thing
Lehigh's the Cement

EASY to LAY

When you get right down to bed rock analysis of profits, you know that nine times out of ten it's the way you handle the labor cost that determines your percentage of profit. When you use

ECONO STEEL TRADE MARK REINFORCING

—you cut labor costs to the minimum, because it is not only the quickest and easiest reinforcing to place, but you are certain that the proper amount of steel is placed where its whole strength will be utilized.

Valuable Pocket Manual FREE

We have prepared for your use an 88-page desk or pocket manual of designing data which you will find extremely valuable. It contains exactly the tabular data and formulae you must frequently require, carefully arranged for instant reference.

We will gladly mail you a copy free if you will enclose your business card with your request.

North Western Expanded Metal Co.
940 Old Colony Bldg.,
Chicago, U. S. A.

Sent Free—

Steelcrete Handbook
A Reference—

One that is complete and accurate, that covers all types of reinforced concrete construction.

We offer it free to you in our Steelcrete Handbook. You will find full data on the design and construction of Sewers, Culverts, Bridges, Buildings. The section on Retaining Walls is more complete than that in any handbook. Indeed it is a reference book well worth consulting.

The Consolidated Expanded Metal Companies

General Offices and Works—Braddock, Pa.
Sales Offices—101 Park Ave., N. Y. City

NEW YORK, N. Y.—Expanded Metal Engineering Company. CAMDEN, N. J.—Expanded Metal Company of Philadelphia. CHICAGO, ILL.—Steelcrete Expanded Metal Co. of Illinois. SAN FRANCISCO, CALIF.—Holloway Expanded Metal Co. BUFFALO, N. Y.—Buffalo Expanded Metal Co. COLUMBIA., S. C.—Southern Steelcrete Expanded Metal Co. TORONTO, CANADA—Baines & Peckover. Stock carried in Principal Cities of U. S. and Canada.

FOOTE BATCH MIXERS

Made by Foote Manufacturing Co., Nunda, N. Y.

Better Design
Better Built

EVERY FOOTE A MIXER

Do Work Cheaper
Wear Longer

Address the nearest agent

Foote Concrete Machinery Co.,	106 So. La Salle St. ..... Chicago, Ill.
W. H. Wilcox,	16 Moffat Ave. ..... Binghamton, N. Y.
E. J. McHarg & Co.,	3 Crandall Street ..... Binghamton, N. Y.
Perrin, Seamans & Co.,	57 Oliver St. ..... Boston, Mass.
Edward R. Bacon Co.,	40 Natoma St. ..... San Francisco
Edward R. Bacon Co.,	328 East Third St. ..... Los Angeles
Hallidie Machinery Co.	..... Seattle and Spokane
Beall & Company	..... Portland, Ore.

The Insley Method of Concrete Distribution

Concrete Spouting Plants, Hoists, Towers, Hoppers and Spouting Sections:
Contractors' Buckets, Cars, Carts, Skips, Slack Line Excavators, Drag Line Buckets, Cableway Skips, etc., etc.

ENGINEERS **INSLEY MFG. CO.** MANUFACTURERS
INDIANAPOLIS, IND.

TRUS-CON INSERTS FOR CONCRETE

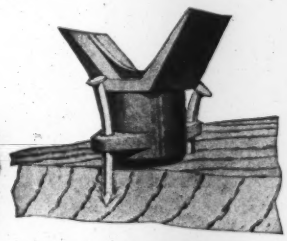
Are installed with the construction, permitting attachment of Shaft Hangers, Fixtures, etc., and eliminating the expense of drilling. Furnished in all types to meet all conditions.

Trus-Con Pressed Steel Slotted Inserts

Permits wide adjustability of location. Furnished with special washers in lengths of 18", 24", 36" 48" and 60".

Kahn Adjustable Inserts

Made of malleable iron allows some adjustability. Furnished for ½", ¾" and ¼" bolts.



Trus-Con National Inserts

Made of highest grade grey iron. Bolt screws into inserts, which are tapped for ½", ⅝" and ¾" bolts.

Interesting Pamphlet covering use of all types of Inserts sent FREE on request.

TRUSSED CONCRETE STEEL COMPANY
Building Specialties Department
312 Trussed Concrete Building, DETROIT, MICH
Reinforcing, Hy-Rib and Lath, Steel Sash, etc.
Representatives in principal Cities.

KAHN Building Products
TRUSSED CONCRETE STEEL CO.

SMOOTH-ON

TRADE MARK-REG.U.S. PAT.OFF.

Iron Cements Nos. 1 & 2

Chemical Iron Cements in powder form; No. 1, quick hardening; No. 2, slow hardening; to be applied to cold metal. Fire, water and steam resistant, expand while setting and become as hard as iron. Our new instruction book, No. 15, tells you all about the different Smooth-On Iron Cements.

Smooth-On Mfg. Co.
Jersey City, N. J., U. S. A.
221 N. Jefferson St., Chicago
36 Sacramento St., San Francisco, Cal.
8 White St., Moorfields, London, E. C.

American Steel & Wire Company's

Trenton-Bleichert System

Aerial Tramways

We are the sole licensees in America of this type of construction. Every detail has been thoroughly worked out and we put into these constructions only material of the most approved and substantial kind including

American Wire Rope

NO matter what the contour of the ground, we will construct a tramway that will transfer material in a bee-line at minimum expense; and no grades are too steep to surmount; no rivers or valleys too wide to cross; and no grading, bridges or viaducts of any kind are required. There is practically no limit to the length of these tramways. We have one line carrying ore twenty-one miles.

Write for our complete descriptive book showing every form of application. And we will be glad to work upon propositions submitted to us, returning full and complete specifications and costs of construction.

American Steel & Wire Company

Chicago New York Cleveland Pittsburgh
Worcester Denver

Export Representative: U. S. Steel Products Co., New York

Pacific Coast Representative: U. S. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle

McCLINTIC-MARSHALL COMPANY

Pittsburgh—New York—Philadelphia—Boston—Pottstown, Pa.—Columbus—Detroit—Chicago—St. Louis—San Francisco.
WORKS—PITTSBURGH, POTTSTOWN AND CARNEGIE, PA.

STEEL BRIDGES AND BUILDINGS

LARGEST INDEPENDENT MANUFACTURERS AND ERECTORS

OFFICES.
NEW YORK, N. Y.
71 Broadway
BALTIMORE, MD.,
Continental Trust Bldg.
BOSTON, MASS.,
70 Kilby Street.
CHICAGO, ILL.,
McCormick Bldg.
MEXICO CITY, MEX.,
Edificio de "La Mutua"

THE PENNYSLVANIA STEEL CO.

BRIDGE AND CONSTRUCTION DEPARTMENT
STEELTON, PA.
DESIGN FABRICATE ERECT
STEEL STRUCTURES OF ALL KINDS

OFFICES.
PHILADELPHIA, PA.,
Morris Bldg.
SAN FRANCISCO, CAL.,
1505 Chronicle Bldg.
ST. LOUIS, MO.,
Commonwealth Trust Bldg.
LONDON, ENG.,
110 Cannon Street.
STEELTON, PA.
At Works.

CAPACITY OF BRIDGE WORKS, 75,000 TONS PER ANNUM

THE PHOENIX BRIDGE COMPANY

Engineers and Builders of **Bridges and Other Structures of Steel**

Works: Phoenixville, Pa.—Established 1790.

Offices: 410 Walnut St., Philadelphia
528 Pierce Building, St. Louis
49 William Street, New York
901 Hurt Building, Atlanta
110 State Street, Boston
26 Victoria St., London, Eng.

LEWIS F. SHOEMAKER & CO.

Steel Bridges and Buildings

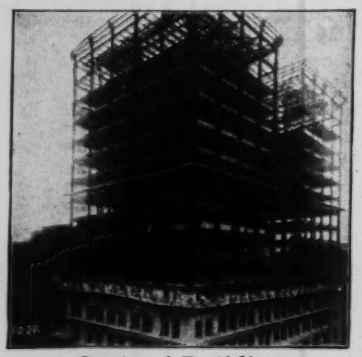
45 Broadway, New York — Main Office and Works Pottstown, Pa. — 2 So. 15th St., Philadelphia

---

AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS



Garland Building,
Chicago, Ill.

SALES OFFICES

NEW YORK, N. Y., 30 Church Street
Philadelphia, Pa., Pennsylvania Building
Boston, Mass. . . John Hancock Bldg.
Baltimore, Md., Continental Trust Bldg.
PITTSBURGH, PA. . . Frick Building
Rochester, N. Y. . . . Powers Block
Buffalo, N. Y. . Marine National Bank
Cincinnati, Ohio . Union Trust Building
Atlanta, Ga. . . . . Candler Building
Cleveland, Ohio . Rockefeller Building
Detroit, Mich., Beecher Ave. & M. C. R. R.
CHICAGO, ILL., 208 South La Salle St.
St. Louis, Mo., Third Nat'l Bank Bldg.
Denver, Colo., First Nat'l Bank Building
Salt Lake City, Utah, Walker Bank Bldg.
Duluth, Minn. . . . . Wolvin Building
Minneapolis, Minn., 7th Ave. & 2nd St., S. E.

Pacific Coast Representative:
U. S. Steel Products Co. Pacific Coast Dept.
SAN FRANCISCO, CAL., Rialto Building
Portland, Ore. . . . . Selling Building
Seattle, Wash., 4th Ave. So. Cor. Conn. St.

Export Representative:
United States Steel Products Co., 30 Church St., N. Y.

Steel for Concrete Reinforcing

Angles, Channels, Channeled Flats, Cultivator Beams and other Miscellaneous Shapes, such as are used by manufacturers of Agricultural Implements and Metal Furniture. In addition to quality and price, we give you service. Try us on your next order.

FRANKLIN STEEL WORKS, Franklin, Pa., U. S. A.

Boston Office, 12 Pearl St.
Philadelphia Office, 411 Real Estate Trust Bldg.
Buffalo Office, Erie County Bank Bldg.
Fort Worth Office, 386 Western Natl. Bank Bldg.
Cleveland Office, 1320 Rockefeller Bldg.
New York Office, 30 Church St.
Chattanooga Office, 328 Carter St.
New Orleans Office, 207 Queen & Crescent Bldg.

ROOFING TIN

Made from high grade COPPER BEARING OPEN HEARTH STEEL—the material you should always specify. Carefully manufactured—fireproof, durable. We also manufacture APOLLO Best Bloom Galvanized Sheets, Black Sheets, Formed Roofing Products, Etc. Write for full information.

AMERICAN SHEET AND TIN PLATE COMPANY, Frick Bldg., Pittsburgh, Pa.

Wisconsin Bridge and Iron Company
Milwaukee, Wis.
Mining, Mill Buildings and Railroad Bridges.
Branches:
1619 Monadnock Block, Chicago, Ill.
505 Moffat Block, Detroit, Mich.

Snead Architectural Iron Works
LOUISVILLE, KY.
STRUCTURAL STEEL and ORNAMENTAL IRON

STRUCTURAL STEEL
for Mills, Factories, Warehouses and Buildings of All Kinds.
CLINTON BRIDGE WORKS CLINTON, IOWA
Engineers and Builders

THE VARIETY IRON & STEEL WORKS COMPANY
CLEVELAND, OHIO
BLAST FURNACES, PLATE WORK, BOILERS, FOUNDRY AND MACHINE WORK
AND STRUCTURAL WORK OF ALL KINDS

Cement Making Factories
ENGINEERING
Plans, Estimates, Construction
Physical and Chemical Tests of Materials
Examinations of Properties. Appraisals
F. L. SMIDTH & COMPANY, Engineers
50 Church Street, New York

HAND POWER BENDERS
for bending Concrete Reinforcement Bars also for general manufacturing. Write for our complete catalog.
WALLACE SUPPLY CO., Mfrs.
418 Orleans Street, Chicago.
2316 Woolworth Bldg., New York City.

RITER-CONLEY MANUFACTURING CO.

Designers Fabricators and Erectors Of STRUCTURAL AND PLATE WORK Of Every Description

Blast Furnaces
Bridges and Girders
Mill and Office Buildings
Gas Holders
Gas Works Construction
Ladles
Oil Refining Plants
Penstocks
Pipes (Riveted Steel)
Stand Pipes, Tanks and Towers
Steel Barges
Oil Tanks
Galvanized Transmission Towers

PITTSBURGH, PA.

Simplex Concrete Piling Co.

Tacony, Philadelphia, Pa.

LICENSEES

CRANFORD PAVING COMPANY
2620 E St., N. W. Washington, D. C.

SIMPLEX FOUNDATION CO.
3400 Disston St., Tacony, Philadelphia

NEW ENGLAND FOUNDATION CO.
73 Tremont St., Boston, Mass.

HURLEY-MASON CO.
623 Perkins Bldg., Tacoma, Washington

NATIONAL CONCRETE CONSTRUCTION CO.
54 Board of Trade Bldg., Louisville, Ky.

CRANFORD CONST. COMPANY
609 Gerke Bldg., Cincinnati, Ohio

CRANFORD CONST. COMPANY
Keystone Bldg., Pittsburgh, Pennsylvania

SIMPLEX CONST. CO.
Coristine Bldg., Montreal, Canada

Please communicate with nearest office.

FORT PITT BRIDGE WORKS

of Pittsburgh, Pa.

BRIDGES - BUILDINGS - STRUCTURAL STEEL

General Office, House Bldg., Pittsburgh, Pa. NewYork Office, 45 Broadway. Chicago Office, Fisher Bldg. Purchasing Dept. and Works, Canonsburg, Pa.

OXWELD EQUIPMENT Makes Large Savings Possible

on all steel cutting and welding. We have some very interesting data on cutting up the framework of the Husted Milling Co's plant after being wrecked in an explosion. Full details sent for the asking.

37th St. & Jasper Pl. CHICAGO — Oxweld Acetylene Co. — 646 Frelinghuysen Ave. NEWARK, N. J.

BERLIN CONSTRUCTION CO.

STEEL BUILDINGS BRIDGES STRUCTURAL WORK

Offices and Works, BERLIN - - CONN.
29 Broadway, New York
Springfield, Mass.

EASTERN BRIDGE & STRUCTURAL CO.

WORCESTER, MASS.

BRIDGES AND BUILDINGS

THE L. SCHREIBER & SONS CO.

CINCINNATI

STRUCTURAL STEEL — ORNAMENTAL IRON

BRANCH OFFICES
NEW YORK CHICAGO PITTSBURG ATLANTA
NEW ORLEANS SAN FRANCISCO RICHMOND

The Mount Vernon Bridge Co.

ENGINEERS AND MANUFACTURERS OF

Iron and Steel Mill Buildings and Structural Work
Railway and Highway Bridges, Roofs, Viaducts, etc.

MOUNT VERNON, OHIO

KENWOOD BRIDGE CO.

PAUL WILLIS, President A. J. T. BENNETT, Secretary

ENGINEERS AND BUILDERS OF STRUCTURAL STEEL WORK

OFFICE, 1416 FIRST NATIONAL BANK BLDG, CHICAGO

WORKS, GRAND CROSSING, ILL. TELEPHONE RANDOLPH 1488

The BUCKEYE TROUGH FLOOR

IS THE BEST FOR BRIDGES, ROADWAYS OR SIDEWALKS. IS ALSO ADAPTED FOR FLOORS OF HEAVY WAREHOUSES, MACHINE-SHOPS, FIRE STATIONS SIDEWALK AREAS, FIREPROOF BUILDINGS AND VAULTS.

THE YOUNGSTOWN IRON & STEEL CO.
YOUNGSTOWN, OHIO

SHERBROOKE, QUE., CANADA

BRIDGES, BUILDINGS, TANKS

Send us your inquiries for

Structural Steel and Plate Work of Every Description

MacKINNON, HOLMES & CO., Limited

MORAVA CONSTRUCTION CO.

ENGINEERS AND CONTRACTORS

Manufacturers of

STRUCTURAL STEEL

For All Purposes. STEEL BUILDINGS, BRIDGES, Etc.

Capacity, 25,000 tons per year.

General Offices and Works: 85th Street and Stewart Ave.
City Office: Suite 1043-1045, People's Gas Bldg. 150 Michigan Blvd., Chicago, Ill.

BELMONT IRON WORKS

Design - Fabricate - Erect Steel Bridges and Buildings

Main Office and Works: Philadelphia, Pa.
New York Office: 32 Broadway - - - Bridge Shops: Eddystone, Pa.

Blaw

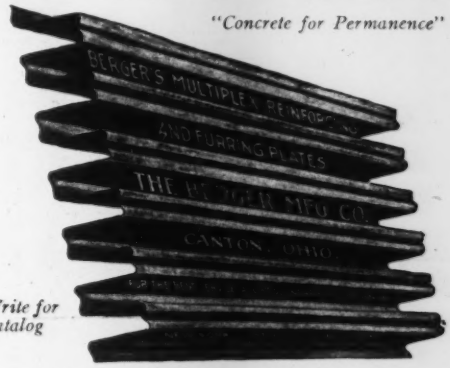
STEEL BUILDINGS
BRIDGES—STEEL POLES
TRANSMISSION TOWERS
BLAW STEEL CONSTRUCTION CO.
General Offices and Works, Pittsburgh, Pa.
New York Office, 165 Broadway. Chicago Office, Peoples Gas Building.

Kinnear

Steel and Wood
Rolling Doors and Shutters
WRITE FOR CATALOGUE "M"
New System of Glazing for Skylights
THE KINNEAR MFG. CO. COLUMBUS, OHIO
BOSTON CHICAGO PHILADELPHIA

Missouri Valley Bridge and Iron Co.
LEAVENWORTH, KANSAS
Engineers and Contractors
For Bridges, both Substructures and Superstructures, Steel Buildings, Fireproof Wharves. Pneumatic and Open Foundations.

"Concrete for Permanence"



Write for Catalog

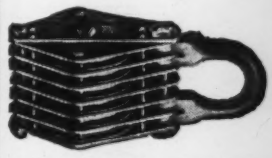
STRUCTURAL STEEL FOR THE WEST.
With the advantages of favorable location, facilities for fabrication, experience in the business, we can give most prompt and efficient service for Buildings, Bridges, Tanks and Towers and all other kinds of steel work.
MINNEAPOLIS STEEL & MACHINERY CO.
Minneapolis Salt Lake City Denver Helena Spokane

LACKAWANNA BRIDGE COMPANY
Consulting Engineers, Designers
Manufacturers of Steel Structures
General Contractors for Fireproof Construction
NEW YORK, CHICAGO, BUFFALO, MILWAUKEE, HOUGHTON, MICH.
WORDEN-ALLEN COMPANY

Established 1868 Incorporated 1886 Reincorporated 1905
PENN BRIDGE CO.
BEAVER FALLS, PA.
Contractors and Manufacturers
Bridges, Buildings, Structural Work Of Every Description
Shops—Beaver Falls and Claysville, Pa. Foundry and Machine Work *Capacity* 20,000 Tons Per Annum

GENUINE PATTERSON BLOCKS
FOR HEAVY WORK

Pittsburgh Block & Mfg. Co.
818 SOUTH AVE.
(N. S.) Pittsburgh, Pa.
Manufacturers of
Strong Steel Blocks
For Strenuous Service
Send for our Catalog and Prices



Star Brand Blocks
Are Standard
If you are in the market for blocks of any description—for hoisting one or one hundred tons—it will save you money to write.
Boston & Lockport Block Co.
108 Condor Street, East Boston, Mass.

STROBEL STEEL CONSTRUCTION CO.
1741 Monadnock Block
CHICAGO, ILL.
CONTRACTING ENGINEERS
STRUCTURAL STEEL WORK
BRIDGES TURNTABLES BASCULE BRIDGES

CARTER CONSTRUCTION COMPANY
JOHN B. CARTER, President
RAILROAD BUILDERS
General Office: 42 Broadway, New York

The Strauss Bascule Bridge Company — Engineers
Specialists in MOVABLE BRIDGES, Designers of
STRAUSS TRUNNION BASCULE BRIDGES
and
STRAUSS DIRECT LIFT BRIDGES
104 South Michigan Avenue, Chicago

MILWAUKEE BRIDGE COMPANY
Engineers, Contractors, Manufacturers
STEEL FRAMED STRUCTURES
of all kinds MILWAUKEE, WIS.

STEEL BARS
FOR
REINFORCING CONCRETE
Manufactured by
LACLEDE STEEL COMPANY
ST. LOUIS, MO.
Works-Madison, Ill. Chicago Office: 332 S. Michigan Ave.

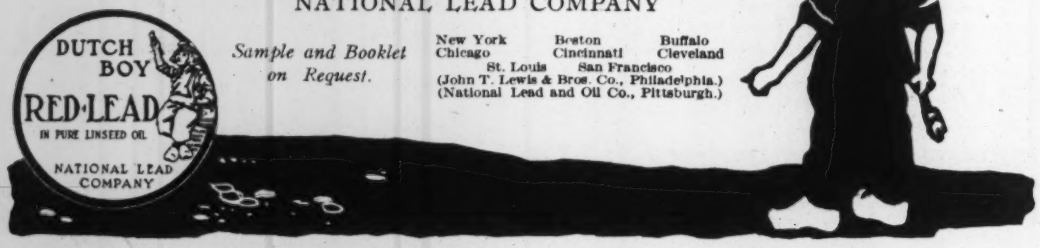
RIVERSIDE BRIDGE CO.
STEEL STRUCTURES
MARTINS FERRY, O.

TAKE high-grade red lead's rust-resistive powers, add to them the benefits of having this superior paint pigment in paste form and you have arrived at

Dutch Boy Red Lead-in-Oil

a paint that completely revolutionizes the protection of structural metal.

NATIONAL LEAD COMPANY



Sample and Booklet on Request.

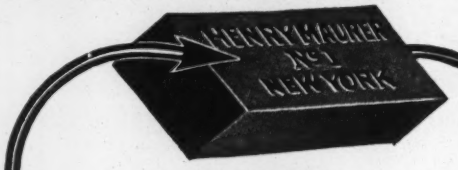
New York Boston Buffalo
Chicago Cincinnati Cleveland
St. Louis San Francisco
(John T. Lewis & Bros. Co., Philadelphia.)
(National Lead and Oil Co., Pittsburgh.)

NOBRAC
Protective Paint

HEAT, cold, moist air, dry air, sleet, snow, heavy winds, vibration, contraction, chemical fumes, coal gas or any other element which destroys all ordinary paint and many so-called "Protective Paints" cannot affect NOBRAC. It protects structures in your neighborhood. Ask us to send you a list of them.

The Patterson-Sargent Co.
Cleveland, Ohio.

Chicago New York St. Paul
Kansas City Dallas



For Over 55 Years
HENRY MAURER
FIRE BRICK, TILES AND BLOCKS

Have been **STANDARD** and used throughout the country in the largest Metallurgical and Chemical Works. Special size to suit requirements.

WRITE FOR PRICES.

HENRY MAURER & SON, Mfrs., 420 East 23d St., New York
Works: MAURER, N. J. Philadelphia Office: Penn Building

HIGGINS'

- DRAWING INKS
- ETERNAL WRITING INK
- ENGROSSING INK
- TAURINE MUCILAGE
- PHOTO MOUNTER PASTE
- DRAWING BOARD PASTE
- LIQUID PASTE
- OFFICE PASTE
- VEGETABLE GLUE, ETC.

ARE the FINEST and BEST GOODS of THEIR KIND

Emancipate yourself from the use of corrosive and ill-smelling inks and adhesives and adopt the **Higgins Inks and Adhesives.** They will be a revelation to you, they are so sweet, clean, well put up, and withal so efficient.

AT DEALERS GENERALLY

CHAS. M. HIGGINS & CO., Mfrs.
Branches: Chicago, London 271 Ninth St., BROOKLYN, N. Y.

Established 1876
CHEESMAN & ELLIOT
Technical Paint Makers
Owners
NATIONAL PAINT WORKS
100 William St., New York
Works
Brooklyn, N. Y. Williamsport, Pa.

LUFKIN
It's An Appreciation of Quality
THE LUFKIN RULE CO.
Saginaw, Mich. New York

MEASURING TAPES ARE USED EVERYWHERE

"BESSEMERPAINT IT"

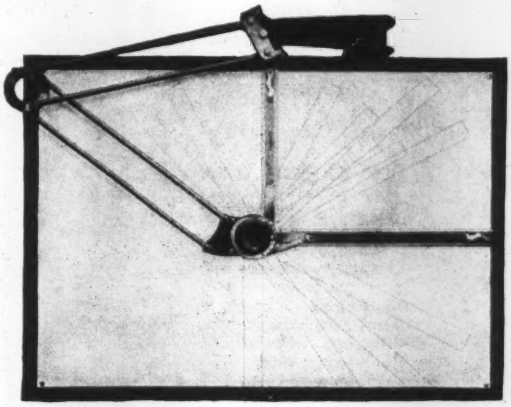
Send Now for our booklet—"What You Do Not Know About Rust Proof Paint." It proves why it will pay you to Bessemer Paint with **Bessemer Rust Proof Paint.**

Rinald Brothers
Philadelphia Pennsylvania

HYDREX Waterproofing Felt
"The Membrane Method Of Waterproofing"

BURLAP
Also Ready Roofings, Asphalts, Waterproof Cloth, Canvas, Building Papers, Deadening Felt, etc.

THE HYDREX FELT & ENGINEERING CO.
120 Liberty St., New York—Chicago—Kansas City—San Francisco

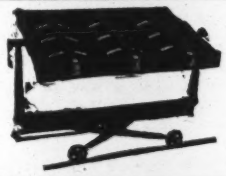


The Universal Drafting Machine has placed the art of drafting on a modern basis.

A Necessity in Modern Drafting Rooms

The Universal Drafting Machine gives greater opportunity for undivided attention to what you are drawing, eliminates a vast amount of purely mechanical drudgery, greatly increases the proportion of time and energy spent on the mental side of an essentially mental occupation, with a direct saving of 25 to 50% of the time required to make a drawing. *Write for further information.*

Universal Drafting Machine Company
Cleveland, Ohio, U. S. A.



Necessities—Good Blueprint Car and Table

The blueprint car at left is convenient for traveling on a track through a window or over an opening in the floor. It revolves and can be clamped at any angle.
The drawing table shown at right is regarded by many as the best low priced table on the market. It is widely adjustable and foldable. It is the "Monroe."
Write for catalog of our complete drafting room line.

AMERICAN DRAFTING FURNITURE CO.
20-34 Railroad St., Rochester, N. Y.

Alteneder Drafting Instruments Excel In Every Essential

Design-Material-Workmanship-Finish

THEO. ALTENEDER & SONS
PHILADELPHIA

Catalogue On Application

If This Style Does Not Meet Your Requirements—We Have Others

The Economy line of Drawing Tables and Filing Cases embrace a range of styles and sizes that will be found to meet every need.

ECONOMY equipment is efficient in design, made from the best material and constructed so as to give satisfaction not only while it is new but in years to come.

Write for Catalogue. Factory prices.

Economy Drawing Table Company
Toledo, Ohio

A New Self-Computing Leveling Rod

NO Just out minus or plus sights, calculations to make after days work in field.

CHICAGO STEEL TAPE COMPANY
6229-6233 Cottage Grove Ave. Chicago, Ill.

Map Cases

Map Mounting of All Kinds

Have you tried the Pease Direct Blue Line Prints for map work? They give perfect satisfaction. Made any width up to 54 inches, and any length in one piece. Ask for new 64-page catalogue E-N.

The C. F. Pease Company
166 W. Adams St., Chicago

"Use A BUFF For Accuracy"

Catalog No. 32 is yours for the request.

BUFF & BUFF MFG. CO.

Makers of Fine Instruments for Civil Engineers.

Jamaica Plain — 1742 Monadnock Block, Chicago

Boston, Mass. — 50 Church St., N. Y. City

When You Buy Get the Best

Buying a transit or level is not an everyday occurrence with you, Mr. Engineer. You do not purchase an instrument without comparisons. We appreciate this and we invite the comparison of

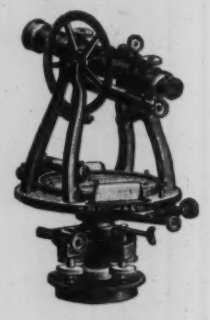
Bausch and Lomb Instruments

with any on the market. Our instruments have a number of distinctive features about them. We believe you will be interested in learning of them. Write us to mail you a copy of our new descriptive catalog, Metro III.

Bausch & Lomb Optical Co.

700 ST. PAUL STREET, ROCHESTER, N. Y.

New York, 200 Fifth Ave. — Washington, 813 15th St., N. W. — Chicago, 122 S. Michigan Blvd. — San Francisco, 154 Sutter St.



You Are Certain of Accuracy

Above all—extreme accuracy and strength. We invite you to put any

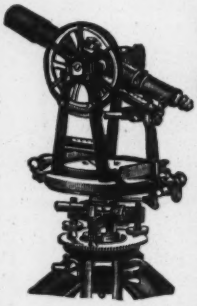
KOLESCH Transits

through a series of rigid tests for two weeks to prove our claim. We are anxious to convince you that this instrument cannot be surpassed by any other for your work.

Write us for full particulars and illustrated Bulletin today.

KOLESCH & CO.

138 Fulton St., New York



Berger TRANSITS AND LEVELS

Are noted for their **great simplicity** in **design, fine workmanship affording results of highest accuracy** by their use in the field. **Once used, always preferred.**

Berger instruments **cost only a little more,** but **last longer** and give 50 per cent. **better** and **quicker results.**

Send for illustrated Catalog.

Order Instruments by code in back of Catalog.

C. L. Berger & Sons, 35 Williams Street, Boston, Mass., U. S. A.

Why You Should Investigate!

Forty-three years' success is the best reason to investigate

H. & B. TRANSITS

Read these exclusive advantages: all graduations are upon inlaid, solid sheet silver—every bearing is bronze against hard bell metal. **Write for free book. Do this now.**

HELLER & BRIGHTLY

Cor. Spring Garden St. and Ridge Ave., Phila., U. S. A.

Second-Hand

TRANSITS, LEVELS, etc.

BOUGHT, SOLD OR EXCHANGED

Send for list of Second-Hand Instruments

Get our prices before ordering

WILLIAMS, BROWN & EARLE, Inc.

Engineering Supplies — Dept. E. 918 Chestnut St., Philadelphia

GURLEY

Engineering Instruments

Mining Engineers will be interested in the New Catalog. Write for it.

W. & L. E. Gurley, Troy, N. Y.

Send for Catalog BX-10 of

Precision Engineering Instruments

WM. AINSWORTH & SONS — THE PRECISION FACTORY — DENVER, COLO. U.S.A.

Directory of Consulting Engineers

NEW ENGLAND

Adams, H. S.,

Civil Engineer.
Wharf and Dock Construction. River and Harbor Works.

108-9 Ames Bldg., Boston, Mass.

Barbour, F. A., M.Am.Soc.C.E. M.Can.Soc.C.E.

Consulting Engineer.
Water Supply, Water Purification, Sewerage and Sewage Disposal.
Tremont Bldg., Boston, Mass.

Fay, Spofford & Thorndike

Consulting Engineers. Bridges and other Structures of Steel and Masonry. Foundations. River and Harbor Work. Frederic H. Fay, Charles M. Spofford Sturgis H. Thorndike. 308 Boylston St., Boston, Mass.

Gray, Samuel M.,

Consulting Engineer for Municipal and Sanitary Work. Room 933 Grosvenor Building.
10 Weybosset St. Providence, R. I.

The Light, Heat & Power Corporation, Boston

Constructing Engineers. Buildings, Steam, Electric and Gas Plants, Transmission Lines. 77 Franklin Street, Boston, Mass.

Main, Charles T., M.Am.Soc. M.E.

Plans and specifications for Textile Mills and other Industrial Plants, Water Power and Steam Power Development. Examinations and Reports on Plants with reference to their Value, Reorganization or Development.

201 Devonshire St., Boston, Mass.

Miller, Hiram Allen, M.Am.Soc. C.E.

Consulting Engineer.
Thirty Years Experience.
Expert Work a Specialty.

8 Beacon Street, Boston, Mass.

Stone & Webster Engineering Corporation

Constructing Engineers.

Water Power Developments, Transmission Lines, Steam Power Stations, Electric Railway and Steam Railroad Work, Industrial Plants, Gas Plants, Steel or Reinforced Concrete Buildings.

New York Boston Chicago.

Weston, Edmund B.,

M.Am.Soc.C.E. M.Inst.C.E.
Consulting Engineer. Water Supply, Filtration, Sewerage, Fire Protection, etc. 86 Weybosset St., Providence, R. I.

Weston, Robert Spurr,

M.Am.Soc.C.E.
Consulting Engineer.
For Water Purification and Sewerage Disposal.
14 Beacon St., Boston, Mass.

NEW YORK

Bowman, Austin Lord

M.Am.Soc.C.E. M.Am.Soc.ME.

Consulting Engineer.

Railroads, Bridges, General Structural Work, Reports, Plans, Estimates, Superintendence.

Telephone, 3431 Cortlandt.

Rooms 500-501, 165 Broadway, New York.

City-Wastes Disposal Co.

(Organized from Staff of Col. Geo. E. Waring, Jr.)

Consulting Engineers.

Specialists in Drainage, Sewerage and Sewage Disposal. Preliminary Investigations and Estimates, Surveys, Plans and Supervision. Sanitary Examinations and Reports.

156 Fifth Ave., New York.

Cole, John A. and Edward S.,

Engineers for Water Works.
Water Waste Investigations with Pitometer.
220 Broadway, New York.

Hugh L. Cooper & Co.,

101 Park Avenue,
New York
General Hydraulic Engineering, including the design, financing, construction and management of hydro-electric power plants.

Diehl, George C., M.Am.Soc. C.E.

Water Supply, Sewerage, Sewage Disposal, Refuse Disposal, Roads and Pavements, Sanitary Engineering. 575 Ellicott Sq., Buffalo, N. Y. 832 Granite Bldg., Rochester, N. Y.

Dow & Smith,

Chemical Engineers, Consulting Paving Engineers.

A. W. Dow, Ph., B., M. Am. Inst. Ch. Engrs. F. P. Smith, Ph., B., M. Am. Soc. C. E., Asphalt, Bitumens, Paving, Hydraulic Cements, Engineering Materials.

131-3 East 23rd Street, New York, N. Y.

Ford, Bacon & Davis,

Engineers

115 Broadway, New York.

New Orleans. San Francisco.

Forstall & Robison,

Engineers.

Design, Operation, Appraisal, Gas and Electric Properties.

84 William Street, New York City.

Fuertes, James H., M.Am.Soc. C.E.

Civil and Sanitary Engineer.

Water Supply and Water Purification, Sewerage and Sewage Disposal.

140 Nassau St., New York.

Fuller, George W.

Consulting Hydraulic Engineer and Sanitary Expert.

Water Supply and Purification, Sewerage and Drainage, Disposal of Sewage and Refuse, Investigations of Epidemics, Water Works Valuations, Supervision of Construction and Operation.

Associate: James R. McClintock.

170 Broadway, New York City.

Goldmark, Henry and Goldmark, C. J.,

Consulting Engineers. Canal and Railway Structures, Industrial Works, Mechanical and Electrical Installations. 103 Park Ave., New York. Kingston, Canada.

Gray, William B., Assoc. M. Am. Soc. C. E.

Engineer. Investigations and Reports, Railroads, Power Plants, Quarries, Harbors, Aqueducts, Sewers, Tunnels, Foundations, Const'n Contracts, Municipal Problems, Lawsuits, Supervision, Operation. 2 Rector St., N. Y.

Hering & Gregory,

Consulting Engineers and Sanitary Experts.

Water Supply and Water Purification, Sewerage, Sewage Disposal and Refuse Disposal. Rudolph Hering, John H. Gregory, Charles Saville.

170 Broadway, New York City.

Hazen & Whipple,

Civil Engineers
Water supply, sewerage, hydraulic and sanitary problems, reports, plans, construction, operation, efficiency tests, valuations, rates.
30 E. 42nd St., New York City.

Hill, Nicholas S., Jr.,

Consulting Engineer.

Water Supply and Sewage Disposal. Evaluations and Reports. Laboratory for Analysis of Water and Sewage and for Testing Cement, Sands, Coal and Metals. Steam and Hydraulic Power Plants.

100 William Street, New York.

Hill, William R., M.Am.Soc. C.E.

Consulting Engineer.
Water Works, Steam Railroads and Canals.

53 State Street, Albany, N. Y.

Hopkins, Charles C., M.Am. Soc.C.E.

Civil and Sanitary Engineer.
Water Supply, Sewerage, Water Power, etc.
349 Cutler Bldg., Rochester, N. Y.

Hooper-Falkenau Engineering Co.

Industrial Engineers and Architects.

Industrial Plants. Power Plants. Business Buildings.

Special Machinery. Appraisals. Reports.

Woolworth Building, New York

Johnson & Fuller,

Consulting Engineers.

Water Works, Sewerage, Water and Sewerage Purification.

150 Nassau Street, New York.

Kent, Robert Sayre, Inc.

Engineers.

Designing, Superintending and Operating Sugar Factories and Refineries, Iron Foundries and other Industrial Plants.

Rotary and Stationary Dryers and other Apparatus and Machinery.

Nassau National Bank Building, 50 Court Street, Borough of Brooklyn, New York City.

Knight & Son, C. W.,

Hydraulic and Sanitary Engineers.
Plans, Estimates, Reports, Supervision. Water Supply, Water Power, Water and Sewage Purification, Land Drainage.
Rome, N. Y.

Continued:

Additional cards appear on the page following.

Landreth, Olin H.,
M.Am.Soc.C.E. M.Am.Soc.M.E.

Consulting Engineer for Hydraulic and Sanitary Works, Valuation for Investment, Condemnation and Indemnity.

156 Fifth Ave., New York.

Union College, Schenectady, N. Y.

Lederle & Provost,

Sanitary Experts and Hydraulic Engineers.
Water Supply, Sewage Purification.
39 W. 38th St., New York.

Lucas, E. W. Van C., M.Am. Soc.C.E.

Formerly Corps of Engineers, U. S. Army. Hydraulics, River and Harbor Improvements.

Municipal Bldg., New York City.

Lucius, Albert,

Engineering Structures, Plans, Specifications, Estimates, Superintendence.

38 Park Row, New York.

Moran, Daniel E., C.E.
M.Am.Soc.C.E. M.Am.Soc.M.E.
Consulting Engineer.
Foundations for Dams, Bridges, Buildings, Subaqueous Work.
55 Liberty St., New York.

Parsons, H. de B.,

Consulting Engineer. Hydraulic and Steam Developments, Municipal and Industrial Engineering. Designs—Reports—Appraisals.
22 William St., New York.

Pollock, Clarence D., M. Am. Soc. C. E.

Consulting Engineer.
Pavements, Specifications, Supervision of Municipal Works.
Park Row Building. New York.

Potter, Alexander,

Consulting Engineer.
Hydraulics Sanitation, Concrete, Structures. Tel. 5501 Cortlandt.
50 Church Street, New York.

Potts, Clyde, M.Am.Soc.C.E.

Civil and Consulting Engineer.
Water Supply, Power; Sewerage and Sewage Disposal.
30 Church St., New York City.

Pratt, Frank E., M. Am. Soc. C. E.

Docks—Tracks—Buildings—Etc., for Industrial Plants and Freight Terminals.
150 Nassau St., New York City.

Robinson & Wagner,

Experts in Sewage Disposal.
37-39 East 28th Street, New York.

Sanderson & Porter,

Engineers.
52 William Street, New York; Nevada Bank Bldg., San Francisco.

Tribus & Massa,

Consultation, Design, Supervision, Valuation—
Water, Sewage, Power, Refuse, Pavements.
86 Warren St., New York.

Vermeule, Cornelius C.
Bishop, Hubert K.

Civil Engineers.
Water-works, Water Power, Sewerage, Seacoast protection and other Hydraulic Construction, Road Improvement, Valuations. Rate Adjustments.
203 Broadway, New York City

Wallace & Co., Joseph H.,

Consulting Industrial Engineers. Industrial and Power Plants—Hydraulic Developments—Investigations — Consultation — Reports.
New York. Montreal. London.

Waring, Chapman & Farquhar,

Sanitary Engineering. Sewerage, Sewage Disposal, Drainage, etc.
874 Broadway, New York, N. Y.

White Companies, The J. G.,

Engineers *Managers*
Financiers
43 Exchange Place, New York.
Chicago, San Francisco, London, Manila, Para, Buenos Ayres, Santiago, Chili.

Young, C. G.,

Engineering and Construction Plans, Methods, Operation. Reports for Financing. American—Foreign Experience.
14 Wall Street, New York.

NEW JERSEY

Owen, James, M.Am.Soc.C.E.

Civil and Consulting Engineer.
196 Market St., Newark, N. J.

Simpson, John T. M. Am. Soc. C. E.

Fireproof Building Construction.
1224 Essex Building, Newark, N. J.

PENNSYLVANIA

Chester & Fleming,

Hydraulic Sanitary and Mechanical Engineers.
Union Bank Building, Pittsburgh, Pa.

Collins, Chas. E., M. Am. Soc. C. E.

Hydraulic and Sanitary Engineer.
Water Supply, Water Power, Sewerage and Sewage Disposal.
Drexel Building, Philadelphia, Pa.

Day & Zimmermann,

Engineers.
Layout, Design, Construction of Industrial Plants.
Engineering, Construction, Operation of Public Service Properties.
Reports—Valuations.
611 Chestnut St., Phila.

Duff, Samuel E.,

Consulting, Designing and Supervising Engineer.
Appraisals, Reports.
Empire Building, Pittsburgh, Pa.

Fayette Engineering Co.,

Civil, Mining and Consulting Engineers.
L. C. Mechling, E. L. Zearley.
Coal, Coke Plants.
Uniontown, Pa.

Kennedy, Julian,

Engineer.
Pittsburgh, Pa., U.S.A.
Cable Address: "Engineer, Pittsburgh."

Ledoux, J. W.,

Consulting Engineer.
Water Works, Hydraulics, Reports and Valuation.
112 No. Broad St., Philadelphia.

Swensson, Emil, M.Am.Soc.C.E.

Consulting and Constructing Engineer.
Pittsburgh, Penn.

WEST VIRGINIA

Wilkins Company, The W. G.,

Engineers and Architects.
Westinghouse Bldg., Pittsburgh, Penn.; Robson-Prichard Bldg., Huntington, W. Va.

CHICAGO

Aetna Engineering Bureau,

Civil and Sanitary Engineers.
Pavements, Water Supply, Sewers.
17 North La Salle St., Chicago.

Allen & Garcia Company,

Andrews Allen C. E., John A. Garcia, E.M.
Consulting Bridge, Structural and Mining Engineers.
Plans, Specifications. Superintendence for Bridges and Structures in Steel or Concrete. Design and Construction of complete Coal Mining Plants. Examination, Reports and Appraisals of Coal Mining and other Properties.
McCormick Bldg., Chicago.

Alvord, John W.,
Burdick, Chas. B.,

Consulting Engineers. Water Supply, Sewerage, Water Power.
Hartford Bldg., Chicago.

Arnold Company, The,

Bion J. Arnold, President.
Engineers and Constructors.
Electrical Civil, Mechanical. Reports and Estimates on Engineering Projects. Engineering.—Specifications and Plans Covering Complete Properties. Construction of Complete Properties and Preliminary Operation of Finished Plant.
105 South LaSalle Street, Chicago, Illinois.

Byllesby, H. M., & Company
(Incorporated)

Purchase, Finance, Construct and Operate Electric Light, Gas, Street Railway and Water Power Properties.
Examination and Reports.
Utility Securities Bought and Sold.
Continental and Commerical Bank Bldg., Chicago. Trinity Bldg., New York.
Tacoma Wash.

Condron Company,

Architectural and Structural Engineers.
Reinforced Concrete and Steel Structures.
Monadnock Bldg. Chicago, Ill.

Drum, A. L. & Company,

Consulting and Constructing Engineers. Steam and Electric Railroads, Gas and Electric Lighting Companies, Physical and Financial Reports.
76 West Monroe St., Chicago.

Maury, Dabney, H.,

M.Am.Soc.C.E. M.Am.Soc.M.E.
Consulting Engineer. Water Works, Power Plants, Sewerage, Appraisals. 1137-8 Monadnock Blk., Chicago.

McMeen and Miller (Inc.)

Electrical and Mechanical Engineers.
S. G. McMeen K. B. Miller
L. S. Keith.
1454 Monadnock Block, Chicago.
407 Electric Building, Cleveland.

Metcalf & Eddy, Consulting Engineers.

Water Works, Sewerage, Disposal of Sewage and Industrial Wastes. Supervision of Operation. Valuations.
14 Beacon Street, Boston, Mass.
Harris Trust Bldg, Chicago, Ill.

Randolph, Isham & Co.,

Consulting Engineers.
Water Power, Sewerage and Water Supply, Land Drainage, River and Harbor Works, Railroads, Bridges and Buildings.
1827 Commercial National Bank Building, Chicago.

CENTRAL WEST

Brenneke & Fay, M.Am.Soc. C.E.
Consulting Engineers.
Steel and Concrete Bridges, Viaducts and Buildings. Foundations. 1200-04 Fullerton Bldg., St. Louis.

Chase, Charles P.,
Hydraulic Engineer, Sanitary Expert. Water Works, Water Power, Sewerage. Chase Block, 123 Sixth Ave., Clinton, Iowa.

Fargo Engineering Co.,
Hydraulic Engineers.
Specialize in the design of Power Plants and Dams on Soil Foundations.
Jackson, Michigan.

Federal Engineering Company,
Civil and Architectural Engineers
218-219 Stephenson Bldg., Milwaukee, Wis.

Harrington, Howard and Ash
Consulting Engineers. Bridges and other structures of steel and reinforced concrete. Advisory services in municipal problems. Appraisals. 1012 Baltimore Avenue, Kansas City, Mo.

Hatton, T. Chalkley,
M. Am. Soc. C. E.—M. Am. W. W. Assoc.
Consulting Engineer. Water Works and Sewerage Systems.
Milwaukee, Wis. City Hall.

Hedrick & Cochrane, M.Am. Soc.C.E.
Designs, Estimates and Supervision of Steel and Reinforced Concrete and other structures.
1118 McGee St., Kansas City, Mo.

Hinchman, T. H., Jr.,
Consulting Engineer.
Power Plants and Valuations.
710 Washington Arcade, Detroit, Mich.

Luten, Daniel B.,
Designing and Consulting Engineer. Reinforced Concrete Bridges Exclusively. Associate Engineers in each State.
Indianapolis.

Turner, C. A. P.,
Consulting Engineer.
M. Am. Soc. C. E. Reinforced Concrete and Structural Steel Bridges, Buildings and Manufacturing Plants.
Suite 816, Phoenix Building, Minneapolis, Minn.

Williams, Gardner S.,
M.Am.Soc.C.E.
M.Am.W.W.Assoc.
M.N.E.W.W.Assoc.
Hydraulics, Water Power and Electrical Developments, Water Supply and Purification, Reports, Plans, Specifications, Surveys, Superintendence and Valuations.
Cornwell Bldg., Ann Arbor, Mich.

SOUTHERN STATES

Brown & Clarkson,
W. N. Brown C. D. S. Clarkson.
Civil and Mining Engineers.
Specialists in Topographic Engineering.
The Star Bldg., Washington, D. C.

Dabney Engineering Co, The, M.Am.Soc.C.E.
T. G. Dabney. A. L. Dabney.
Municipal Improvements, Drainage. 81 Porter Bldg., Memphis, Tenn.

Elrod, Henry E.,
M.Am.Soc.M.E.
Assoc.M.Am.Soc.C.E.
Mechanical and Structural Engineering, Inspections, Reports and Superintendence. Southwestern Life Building, Dallas, Texas.

Hatton, Herbert W.,
Consulting Civil, Sanitary and Hydraulic Engineer. Water Supply, Drainage and Sewerage Systems, Sewage Disposal and Improved Pavements. Equitable Building, Wilmington, Del.

Knowles, Morris, M.Am.Soc. C.E.
Water Supply and Purification. Sewerage and Sewage Disposal. Investigations, Designs.
Pittsburgh, Pa.; Birmingham, Ala.

Morgan Engineering Co.,
Civil Engineers.
Reclamation of Wet and Overflowed Lands.
Memphis, Tennessee.

Newcomb, John Lloyd,
Consulting Civil Engineer.
ater Supply, Sewerage Disal, Examinations, Reports.
University, Virginia.

Ritchie, E. Warren,
Engineer.
Municipal Hydro-electric.
Mechanics Building, Petersburg, Va.

PACIFIC STATES

American Engineering Corporation,
C. E. Grunsky, President.
All Branches of Engineering.
Mechanics' Institute Bldg., San Francisco, Cal.

Amweg, Frederick J., M. Am. Soc. C. E.
Consulting Engineer and Manager of Construction.
Buildings, and all classes of Engineering Structures; Electric Railways and Lighting; Plans and Specifications furnished; Construction Superintended; Physical and Financial Reports on Public Utilities and Industrial Plants on Pacific Coast and Island Possessions: Valuations for Investments. 244 Kearny St., San Francisco, California.

Snyder, C. H., M. Am. Soc. C. E.
Designing and Consulting Engineer.
Bridges, Buildings, Foundations and Industrial Plants, Estimates and Reports. Steel and Reinforced Concrete Construction. 251 Kearny St., San Francisco, Calif.

Whitham, Paul P.
Railways, Terminals, Docks, Industrial Bldgs., Grain Elevators, Freight Handling Equipment, City Planning. Reports, Estimates, Designs, Superintendence. New York Block, Seattle, Wash., Phone Elliott 4582.

CANADA

Kerry & Chace, Limited
Engineers. Steam and Hydro-electric Developments, Steam and Electric Railways, Irrigation and Water Supply.
Toronto and Winnipeg.

Robinson, A. W.,
M.Am.Soc.C.E. M.Am.Soc.M.E.
Mechanical Engineer. Dredging Machinery of Every Type Designed for Special Conditions. 14 Phillips Square, Montreal, Can.

INSPECTING AND TESTING ENGINEERS

Allentown Testing Laboratory,
Engineers and Chemists. Mill Inspection and Laboratory Tests. Structural and Road Materials. New Laboratories. Allentown, Pa.

American Bureau of Inspection and Tests,
Consulting and Inspecting Engineers. Cement Specialists,
Monadnock Block, Chicago.
Minneapolis. Milwaukee.

Gulick-Henderson Co.,
Inspecting and Testing Engineers.
Pittsburgh, Chicago, New York, San Francisco.

Hildreth & Company,
Consulting and Inspecting Engineers.
Philadelphia, Pittsburgh, Chicago, Mills Bldg., 15 Broad St., New York.

Hunt, Robert W. & Co.,
Robert W. Hunt, Jno. J. Cone, Jas. Hallsted, D. W. McNaugher,
Bureau of Inspection Tests and Consultation. Inspection and Testing of All Engineering Materials.
Established Offices in—Chicago, Pittsburgh, London, San Francisco, Seattle, New York, St. Louis, Montreal, Toronto, Mexico City, Vancouver.

Jones Company, Morgan T.,
Consulting and Inspecting Engineers.
Inspection of Rails and Fastenings, Cars, Locomotives, Bridges and Buildings, Cast Iron Pipe, etc. Cement Testing. Chemical Analysis and Physical Tests.
General Offices: Monadnock Block, Chicago. 15 Broad Street, New York City. 313 Wabash Building, Pittsburgh, Pa.

McKenna, Dr. Charles F.,
Consulting Chemist and Chemical Engineer.
Expert in Technology and Testing of Materials.
Investigations and Reports for investors upon industrial processes.
50 Church St., New York City

Pittsburgh Testing Laboratory,
Engineers and Chemists.
Inspection of Rails, Cars, Bridges and Buildings, Pipe, Boilers, Engines, etc.; Cement Testing and Inspection at Mills before Shipment. Chemical and Physical Tests. Consultation and Reports.
"P.T.L." Bldg., Pittsburgh; 50 Church St., New York; 1330 Monadnock Block, Chicago; 651 Howard Street, San Francisco, 204 White Bldg., Seattle; 1127 Chemical Bldg., St. Louis; 211 Bell Block, Cincinnati; 509 Woodward Bldg Birmingham-305 Praetorian Bldg., Dallas.

Underwriters' Laboratories,
under the direction of the National Board of Fire Underwriters, W. H. Merrill, Manager. Principal office and testing station, Chicago. Branch offices in all principal cities in the United States and Canada.
New York Office, 135 William Street. London Office, 48 Westminister Palace Gardens.

Continued:

Cards of Engineering Schools and Colleges appear on the page following.

ENGINEERING SCHOOLS AND COLLEGES

Clarkson College of Technology,

Civil, Electrical, Mechanical, Chemical Engineering. Small Classes. Full Equipment. Potsdam, N. Y.

New York University School of Applied Science,

Departments of Civil, Mechanical and Chemical Engineering.

For announcements or other information address Chas. Henry Snow, Dean.

University Heights, N. Y. City.

Rensselaer Polytechnic Institute, The,

Engineering and Science.
Courses in Civil Enigineerng (C.E.)
Mechanical Engineering (M.E.)
Electrical Engineering (E.E.)
Chemical Engineering (Ch.E.)
and General Science (B.S.)
Graduate Courses leading to Masters' and Doctors' Degrees.
Also special courses. Unsurpassed new Chemical, Physical, Electrical, Mechanical and Materials Testing Laboratories.
Troy, N. Y.

College of Engineering,

Courses in Civil, Mechanical, Electrical, Mining, Sanitary, Municipal and Architectural Engineering. Thorough, Practical, Economical. School in session the entire year. Enter any time. No Matriculation or Registration Fees. Expenses ¼ to ½ less than at other first-class schools. Length of courses 2½ years. Experienced Instructors. Splendid Laboratories. For Catalog, Bulletins or information address:
Albert Edwin Smith, President, Ohio Northern University, Ada, Ohio.

Pennsylvania Military College

51st Year. The institution offers thorough scientific and military instruction so combined as to give superior equipment for either professional or business life. Degrees granted—Civil Engineering (C.E.), Chemistry (B.S.), Aris (A.B.) Preparatory Courses also.

Catalogs of Col. C. E. Hyatt, President.

Chester, Pa.

Montana State School of Mines,

Located in a Great Mining District. Thorough course of four years in Mining and Metallurgy equips young men for immediate service in Mines and Reduction Works. For information address Registrar.

Butte, Montana.

The Cards

appearing on these pages go before over twenty thousand people weekly.

You can enlarge your field of buisness at small expense through this directory.

Incidentally you will be establishing prestige by including your name with the foremost engineers of the country, whose cards are here.

New cards appear only with the first issue of each month.

Write for rates now.

What and Where to Buy

ALPHABETICAL LIST OF EVERYTHING USED IN CIVIL ENGINEERING AND CONTRACTING WITH NAMES OF MAKERS

Asbestos Products
Johns-Manville Co., H.W.

Ash Handling Machinery
Jeffrey Mfg. Co.
Link-Belt Co.
Stephens-Adamson Mfg. Co.

Asphalt
Sicilian Asphalt Paving Co.

Ballast Unloaders
Marion Steam Shovel Co.

Bar Benders
Koehring Machine Co.

Bar Cutters
Koehring Machine Co.

Barges (Steel)
Chicago Bridge & Iron Works
Des Moines Bridge & Iron Co.
Pittsburgh-Des Moines Steel Co.

Barges, Steel and Wood
American Bridge Co.

Bearings and Bushings
Metaline Co.

Belting
Jeffrey Mfg. Co.
Main Belting Co.
Robins Conveying Belt Co.

Benders, Bar
Ransome Concrete Machinery Co.
Wallace Supply Co.

Bins, Storage
Brown Hoisting Mchry. Co.
Jeffrey Mfg. Co.
Ransome Concrete Machinery Co.
Raymond Concrete Pile Co.

Blasting Supplies
Keystone National Powder Co.

Blocks
Boston & Lockport Block Co.
Contractors' Plant Mfg. Co.
Dobbie Foundry & Machine Co.
Pittsburgh Block & Mfg. Co.

Blow-pipes and Burners
American Gas Furnace Co.

Blowers
Kerr Turbine Co.

Blowers, Pressure
American Gas Furnace Co.

Blue Prints
Pease Co., C. F.

Blueprinting Machines
American Drafting Furniture Co.
Pease Co., C. F.
Williams, Brown & Earle

Boilers
Babcock & Wilcox Co.
Dover Boiler Works
Lidgerwood Mfg. Co.
Struthers-Wells Co.

Boiler Tubes
National Tube Co.

Bolts
Pennsylvania Steel Co.

Books
Berrian & Douglas
McGraw-Hill Book Co., Inc.
Wiley & Sons, Inc., John

Brakes, Air
Westinghouse Air Brake Co.

Bridges and Buildings
American Bridge Co.
Belmont Iron Works
Berlin Construction Co.
Blaw Steel Construction Co.
Chicago Bridge & Iron Works
Clinton Bridge Works
Des Moines Bridge & Iron Co.

Bridges and Buildings —Continued
Eastern Bridge & Structural Co.
Fort Pitt Bridge Works
Kenwood Bridge Co.
Lackawanna Bridge Co.
Lackawanna Steel Co.
MacKinnon - Holmes & Co.
McClintic-Marshall Co.
Milwaukee Bridge Co.
Minneapolis Steel & Machinery Co.
Missouri Valley Bridge & Iron Co.
Morava Construction Co.
Mt. Vernon Bridge Co.
Penn Bridge Co.
Pennsylvania Steel Co.
Phoenix Bridge Co.
Pittsburgh-Des Moines Steel Co.
Riter-Conley Mfg. Co.
Riverside Bridge Co.
Schreiber & Sons, L.
Shoemaker, Lewis F.
Snare & Triest Co.
Snead Architectural Iron Works
Strobel Steel Construction Co.
Variety Iron & Steel Works
Wisconsin Bridge & Iron Co.
Worden-Allen Co.

Bridges, Bascule
American Bridge Co.
Strauss Bascule Bridge Co.
Strobel Steel Construction Co.

Buckets, Concrete
Brown Hoisting Mchry. Co.
Hayward Co., The
Ransome Concrete Machinery Co.
Union Iron Works

Buckets, Drag-Line Scraper
Hayward Co., The
Insley Mfg. Co.
Marion Steam Shovel Co.

Buckets, Dredging
American Bridge Co.
Hayward Co., The
Industrial Works
Owen Bucket Co.
Williams Co., G. H.

Buckets, Elevator
Stephens-Adamson Mfg. Co.

Buckets, Grab
Brown Hoisting Mchry. Co.
Jeffrey Mfg. Co.
Orton & Steinbrenner Co.
Owen Bucket Co.
Whiting Foundry Equipment Co.
Williams Co., G. H.

Buckets, Orange Peel and Clam Shell
Browning Co., The
Hayward Co., The
Industrial Works
Jeffrey Mfg. Co.
Owen Bucket Co.
Union Iron Works
Whiting Foundry Equipment Co.

Building Paper
Barrett Mfg. Co.

Cableways
American Steel & Wire Co.
Brown Hoisting Machinery Co.
Flory Mfg. Co., S.
Lidgerwood Mfg. Co.
Waterbury Co., The

Caissons
American Bridge Co.
Dover Boiler Works
Struthers-Wells Co.

Car Dumpers
Brown Hoisting Mchry. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.

Cars, Contractors
Insley Mfg. Co.
Union Iron Works
Western Wheeled Scraper Co.

Cars, Dump
Insley Mfg. Co.
Western Wheeled Scraper Co.

Cars, Industrial
Hunt Co., Inc., C. W.
Ramapo Iron Works
Smith Co., The T. L.

Cars, Spreader
Western Wheeled Scraper Co.

Carts, Concrete
Insley Mfg. Co.
Ransome Concrete Machinery Co.
Smith Co., The T. L.

Castings, Brass and Bronze
McKim Foundry & Machine Co.

Castings, Iron and Steel
Central Foundry Co., The
Fox & Co., John
Kellogg Co., M. W.
Lackawanna Steel Co.
Marion Malleable Iron Works
McConway & Torley Co.
McKim Foundry & Machine Co.
National Transit Co.
Parsons Co., G. W.
Robins Conveying Belt Co.
Sessions Foundry Co.
United States Cast Iron Pipe & Foundry Co.
Warren Foundry & Machine Co.

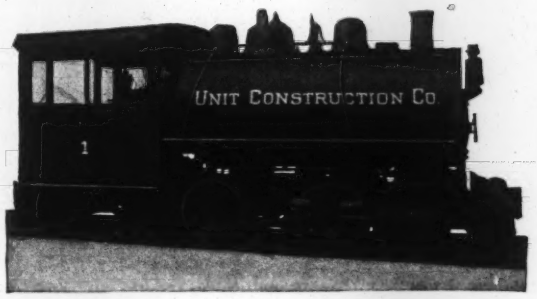
Castings, Malleable Iron
Jeffrey Mfg. Co.
Marion Malleable Iron Works

Castings (Street and Sewer)
Central Foundry Co., The
Lackawanna Steel Co.
McKim Foundry & Machine Co.
Sessions Foundry Co.
United States Cast Iron Pipe & Foundry Co.

Cement for Iron
Smooth-On Mfg. Co.

Cement-Making Machinery
Alexander Iron Works
Smidth & Co., F. L.
Vulcan Iron Works (Wilkes-Barre)

INDUSTRIAL LOCOMOTIVES



Light locomotives for contractors and switching around industrial plants must be as carefully designed and constructed as larger locomotives.

We have spent a great deal of time and money in developing our light locomotives. The designs have been carefully considered, and the locomotives are as good as they can be made. Every bit of material is carefully selected and tested.

Remember that we carry interchangeable repair parts in stock for immediate shipment.

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK

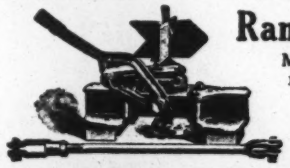
McCormick Building, Chicago, Ill. Dominion Express Building, Montreal, Canada
Carl G. Borchert, Pioneer Bldg., St. Paul, Minn. A. Baldwin & Co., New Orleans, La.
N. B. Livermore & Company, Los Angeles, and San Francisco, California.
Northwestern Equipment Company, Seattle, Wash., and Portland, Oregon.

Vulcan Heavy Power

IN the many cases where powerful locomotives are needed, it is wise to choose a design having a widely successful service record behind it, and whose builders are known as among the foremost American Locomotive builders.
If you should finally choose VULCAN locomotives the interest of the VULCAN IRON WORKS in your purchase will show you the value of VULCAN SERVICE, even long after the engines have paid for themselves.
VULCANS may be built to you own specifications, our standard designs, or to new drawings prepared jointly by your engineers and ours.
VULCANS—up to 100 tons—may have saddle tank or separate tender, Stephenson, Walschaert or any other valve gear, Superheated or Saturated Steam and any accessory that's proved itself in locomotive practice.

PLANTATION—LOGGING—INDUSTRIAL—CONSTRUCTION

Vulcan Iron Works, 1736 Main St., Wilkes-Barre, Pa.
New York Chicago

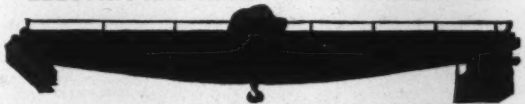


Ramapo Iron Works

Main Office, Hillburn, N. Y.
New York Office, 30 Church St.

Switch Stands, Plantation Cars, Switches, Frogs, Etc.

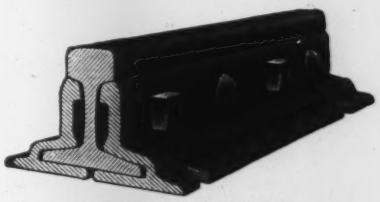
ELECTRIC AND HAND TRAVELING CRANES



Electric Hoists **NORTHERN ENGINEERING WORKS.** Get Catalog
DETROIT, MICH. U.S.A.

The Rail Joint Company

GENERAL OFFICES:
185 Madison Avenue, New York City



Continuous Rail Joint

Makers also of Weber, Wolhaupter and 100% Rail Joints for Standard, Girder, and Special rail sections. Also joints for frogs and switches. Insulated Rail Joints, and Step or Compromise Rail Joints.

Patented in United States and Canada.

Catalog at Agencies

Boston, Mass.	India Bldg.
Chicago, Ill.	Railway Exchange Bldg.
Denver, Colo.	Equitable Bldg.
Philadelphia, Pa.	Pennsylvania Bldg.
Pittsburgh, Pa.	Oliver Bldg.
Portland, Ore.	Wilcox Bldg.
St. Louis, Mo.	Commonwealth Trust Bldg.
Troy, N. Y.	Burden Avenue
Montreal, Can.	Board of Trade Bldg.
London, E. C., Eng.	36 New Broad St.

Cement, Natural
Alsen's American Portland Cement Works
Atlas Portland Cement Co.

Cement, Portland
Alpha Portland Cement Co.
Alsen's American Portland Cement Works
Atlas Portland Cement Co.
French & Co., S. H.
Hartranft Cement Co.
Ironton Portland Cement Co.
Lawrence Cement Co.
Lehigh Portland Cement Co.
Nazareth Cement Co.

Cement, Portland, White
Atlas Portland Cement Co.
French & Co., S. H.
Lawrence Cement Co.

Centers, Steel Collapsible
Blaw Steel Construction Co.

Chain
Pittsburgh Block & Mfg. Co.

Chains, Transmission
Link-Belt Co.
Morse Chain Co.

Channeling Machines
Ingersoll-Rand Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.

Chimneys, Concrete
Kellogg Co., M. W.
Weber Chimney Co.
Wiederholdt Construction Co.

Chimneys, Radial Brick
Bergen & Lindeman
Heine Chimney Co.
Heinecke, Inc., H. R.
Kellogg Co., M. W.
Wiederholdt Construction Co.

Chimneys, Tile
Wiederholdt Construction Co.

Cloth, Tracing
Pease Co., C. F.

Coal- and Ore-Handling Machinery
Berquist, A. S.
Brown Hoisting Mchry. Co.
Browning Co., The
Hayward Co., The
Hunt Co., Inc., C. W.
Jeffrey Mfg. Co.
Link-Belt Co.
Stephens-Adamson Mfg. Co.
Whiting Foundry Equipment Co.

Coal-Storage Systems
American Bridge Co.
Berquist, A. S.
Brown Hoisting Mchry. Co.
Des Moines Bridge & Iron Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Pittsburgh-Des Moines Steel Co.
Stephens-Adamson Mfg. Co.

Coal Washers
Vulcan Iron Works (Wilkes-Barre)

Compounds, Cement Waterproofing
Rinald Bros.
Smooth-On Mfg. Co.
Trussed Concrete Steel Co.

Compressors, Air
American Well Works
Ingersoll-Rand Co.
McGowan Co., John H.
McKiernan-Terry Drill Co.
National Transit Co.
Norwalk Iron Works Co.
Otto Gas Engine Works
Sullivan Machinery Co.
Westinghouse Air Brake Co .

Compressors, Gas and Ammonia
Norwalk Iron Works Co.

Concrete Construction
Berger Mfg. Co.
Brown Hoisting Mchry. Co.
Concrete Steel Co.
Consolidated Expanded Metal Co.'s
Raymond Concrete Pile Co.
Trussed Concrete Steel Co.

Concrete Finishing Tools
Ransome Concrete Machinery Co.

Concrete Floor Contings
Trussed Concrete Steel Co.

Concrete Reinforcement
American Steel & Wire Co.
Brown Hoisting Mchry. Co.
Concrete Steel Co.
Consolidated Expanded Metal Co.'s
Franklin Steel Works
Laclede Steel Co.
North Western Expanded Metal Co.
Trussed Concrete Steel Co.

Condensers
Alberger Pump & Condenser Co.
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
Kellogg Co., M. W.
McGowan Co., John H.

Conduit
Johns-Manville Co., H.W.
Wyckoff Pipe & Creosoting Co.

Contractors, General
Carter Construction Co.
Gillespie Co., The T. A.

Conveyors
Hunt Co., Inc., C. W.
Jeffrey Mfg. Co.
Link-Belt Co.
Main Belting Co.
Ohio Locomotive Crane Co.
Robins Conveying Belt Co.
Stephens-Adamson Mfg. Co.
Vulcan Iron Works (Wilkes-Barre)

Corner Bead Metal
Berger Mfg. Co.
Consolidated Expanded Metal Co.'s

Couplers, Car
McConway & Torley Co.

Cranes, Locomotive
Brown Hoisting Mchry. Co.
Browning Co., The
Industrial Works
Link-Belt Co.
Ohio Locomotive Crane Co.
Orton & Steinbrenner Co.

Cranes, Traveling
Brown Hoisting Mchry. Co.
Northern Engr. Works
Whiting Foundry Equipment Co.

Cranes, Wrecking
Brown Hoisting Mchry. Co.
Browning Co., The
Industrial Works
Ohio Locomotive Crane Co.

Creosoting
American Creosote Wks.
Barber Asphalt Paving Co. (Maurer)
Barrett Mfg. Co.
Carbolineum Wood Preserving Co.
International Creosoting & Construction Co.
Norfolk Creosoting Co.
Northeastern Co., The
Republic Creosoting Co.
Wyckoff Pipe & Creosoting Co.

Crushers and Pulverizers
Acme Road Mchry. Co.
Austin Mfg. Co.
Bacon, Earle C.
Buchanan Co., Inc., C. G.
Jeffrey Mfg. Co.
Orton & Steinbrenner Co.
Robins Conveying Belt Co.
Smidth & Co., F. L.
Smith Co., The T. L.
Vulcan Iron Works (Wilkes-Barre)
Western Wheel Scraper Co.

Culverts, Metal
American Rolling Mill Co.
American Sheet & Tin Plate Co.
Atlas Metal Works
Bark Bridge & Culvert Co.
California Corrugated Culvert Co.
Coast Culvert & Flume Co.
Corrugated Culvert Co.
Delaware Metal Culvert Co.
Dixie Culvert & Metal Co.
Hardesty Mfg. Co., R.
Illinois Corrugated Metal Co.
Independence Culvert Co.
Iowa Pure Iron Culvert Co.
Kentucky Culvert Co.
Lee Arnett Co.
Lone Star Culvert Co.
Lyle Corrugated Culvert Co.
Michigan Bridge & Pipe Co.
Montana Culvert Co.
Nebraska Culvert & Mfg. Co.
Nevada Metal Mfg. Co.
New England Metal Culvert Co.
North-East Metal Culvert Co.
North Western Sheet & Iron Works
Ohio Corrugated Culvert Co.
O'Neal, W. Q.
Pennsylvania Metal Culvert Co.
Road Supply & Metal Co.
Sioux Falls Metal Culvert Co.
Spencer, J. N.
Spokane Culvert & Tank Co.
Tennessee Metal Culvert Co.
Utah Culvert Co.
Virginia Metal Culvert Co.
Western Metal Mfg. Co.

Curb and Curb and Gutter Forms
Blaw Steel Construction Co.

Cutting, Oxy-Acetylene
Oxweld Acetylene Co.

Cylinders, Steel
National Tube Co.

Derricks
American Bridge Co.
Chicago Bridge & Iron Works
Contractors' Plant Mfg. Co.
Dobbie Foundry & Machine Co.
Flory Mfg. Co., S.
Hayward Co., The
Lidgerwood Mfg. Co.
Terry & Tench, Inc.

Derrick Irons
Dobbie Foundry & Machine Co.
Hayward Co., The
Terry & Tench, Inc.
Union Iron Works

Diving Apparatus
Morse & Son, Inc., A. J.
Schrader's Sons, Inc., A.

Doors, Steel and Wood Rolling
Kinnear Mfg. Co.

Drafting Machines
Universal Drafting Machine Co.

Drag Line Cableway Excavators
Insley Mfg. Co.

Drawing Materials
Alteneder & Sons, Theo.
Kolesch & Co.

Dredges
Ellicott Machine Corp.
Hayward Co., The
Marion Steam Shovel Co.
Morris Machine Works

Drills, Core
Ingersoll-Rand Co.
Keystone Driller & Pump Co.
McKiernan-Terry Drill Co.
Sullivan Machinery Co.

Drills, Hammer
Ingersoll-Rand Co.
McKiernan-Terry Drill Co.
Sullivan Machinery Co.

Drills, Rock
Ingersoll-Rand Co.
McKiernan-Terry Drill Co.
Sullivan Machinery Co.

Dryers
Hartlett & Snow Co., C. O.
Dover Boiler Works
Whiting Foundry Equipment Co.

Dynamite
Keystone National Powder Co.

Electrical Wires and Cables
American Steel & Wire Co.

Elevator, Wire Rope
American Steel & Wire Co.

Elevators, Bucket
Acme Road Mchry. Co.
Hunt Co., Inc., C. W.
Jeffrey Mfg. Co.
Link-Belt Co.
Ohio Locomotive Crane Co.
Robins Conveying Belt Co.
Smith Co., The T. L.
Stephens-Adamson Mfg. Co.

Elevators, Concrete
Koehring Machine Co.
Ohio Locomotive Crane Co.
Ransome Concrete Machinery Co.
Smith Co., The T. L.

Engineers, Consulting
See Alphabetical Index

Engines, Gas and Gasoline
Hersey Mfg. Co.
National Meter Co.
Otto Gas Engine Wks.

Engines, Hoisting
Brown Hoisting Mchry. Co.
Contractors' Plant Mfg. Co.
Dobbie Foundry & Machine Co.
Flory Mfg. Co., S.
Koehring Machine Co.
Lidgerwood Mfg. Co.
Otto Gas Engine Works

Engines, Oil
National Transit Co.
Otto Gas Engine Works
Snow Steam Pump Plant

Engines, Pumping
Deane Steam Pump Plant
Ellicott Machine Corp.
McGowan Co., John H.
Morris Machine Works
National Transit Co.
Otto Gas Engine Works

Engines, Steam
Lawrence Machine Co.

Excavating Attachment, Derrick
Union Iron Works

Excavating Machinery
Carson Trench Machine Co.
Insley Mfg. Co.

Excavators, Drag Line
Hayward Co., The
Insley Mfg. Co.
Lidgerwood Mfg. Co.
Marion Steam Shovel Co., The
Owen Bucket Co.
Parsons Co., G. W.

Expanded Metal
Consolidated Expanded Metal Co.'s.
North Western Expanded Metal Co.
Trussed Concrete Steel Co.

Explosives
Keystone National Powder Co.

Fencing and Gates
American Steel & Wire Co.

Filters, Water
American Water Softener Co.
New York Cont'l Jewell Filtration Co.
Norwood Engr. Co.
Pacific Tank & Pipe Co.
Pittsburgh Filter Mfg. Co.
Simplex Valve & Meter Co.

Fire Brick
Maurer & Son, Henry

Flat Wire Steel
American Steel & Wire Co.

Flooring
Berlin Mills Co.
Johns-Manville Co., H.W.
Youngstown Iron & Steel Co., The

Flumes, Metal
American Sheet & Tin Plate Co.
Hinman Hydraulic Mfg. Co.

Flush Tank Siphons
Pacific Flush-Tank Co.

Form Clamps
Insley Mfg. Co.

Forms, Metal for Concrete
American Bridge Co.
Blaw Steel Construction Co.
Hydraulic Pressed Steel Co.
Ransome Concrete Machinery Co.

Foundations
Raymond Concrete Pile Co.
Simplex Concrete Piling Co.

Frogs and Switches
Ramapo Iron Works

Furnaces, Annealing and Tempering
American Gas Furnace Co.
Whiting Foundry Equipment Co.

Furnaces, Gas
American Gas Furnace Co.

Furniture and Supplies, Drafting Room
American Drafting Furniture Co.
Economy Drawing Table Co.

16 Days Two and one-eighth miles of Bituminous top, sixteen feet wide, and three inches thick, after being rolled in place.

12 Days Five thousand, three hundred fifty-seven lineal feet of fourteen foot road, eight inches deep, after being rolled in place.

Both of these records were made by New York State Road contractors with the Acme 12" x 22" Crusher, No. 10½ D.

Sixteen other sizes. Send to-day for your copy of our General Catalogue.

Acme Road Machinery Co.
54 S. Main St. Frankfort, N. Y.

Live agents wanted in unoccupied territory.

The Test That Tells

Ten or Fifteen years' continuous service without interruption for repairs has often been obtained with Bristol Recording Instruments. The unique simplicity of construction of

BRISTOL'S Recording Instruments

is responsible for their great durability and reliability in long continued service.

When you are in the market for recording instruments consider the fact that the practical value of automatic recorders depends chiefly upon whether the recording instrument used can be relied upon to give dependable results month after month, and year, after year without expert attention. Ask any one of your friends who has used Bristol Recorders continuously for ten years, about their characteristics, simplicity and reliability. They are unique in their simplicity of construction. More than 50,000 have been sold.

Write for Bulletin N-161 mentioning your needs.

THE BRISTOL COMPANY, Waterbury, Conn

Economic Conveying Machinery

Our Engineering Force Is Ready to Act on Any Proposition—Large or Small

Consult us about reducing the cost of handling all kinds of raw and finished materials in Foundries, Iron Mills, Warehouses, Power Plants, Factories, Coaling Stations, etc.

Our Engineering Corps will gladly go over any proposition you put up to them and submit suggestions and quotations covering any type of installation—large or small.

The "Hunt System" is known wherever economic conveying machinery has a use.

There are many instances on record where the Hunt System made it possible for one man to equal the working capacity of 25 men.

Just say you are interested and we'll get busy.

C.W. HUNT COMPANY Inc. West New Brighton. N.Y.

Robins Conveying Machinery

A ROBINS Belt Conveyor, 860 ft. long, running in the gallery, carries grain from the dock to the plant on the upper run of the belt, and carries bags of coke from the plant to the dock on the lower run of the belt. If you are not acquainted with the Robins System, send for our Bulletins.

ROBINS CONVEYING BELT COMPANY
ENGINEERS - FOUNDERS - MACHINISTS

14 Park Row, New York CHICAGO Old Colony Building

San Francisco, The Griffin Co. Spokane, United Iron Works. Toronto, Gutta Percha & Rubber, Ltd. New Glasgow, Eastern Steel Co., Ltd. London, E. C., Fraser & Chalmers, Ltd.

A Saving of $50.00 Per Day

is the result of installing this

JEFFREY CONVEYER

Continuous Freight Carrier between wharf and warehouse, Wall Street, Seattle, Wash.

Length 250 ft. Handles 1200 filled barrels per hour.

Carries miscellaneous pieces weighing up to 1000 lbs. each.

We will tell you how the above saving was made, also show you how to effect enormous reductions in your operating costs, if you will write us about your problem and let us furnish the RIGHT EQUIPMENT to meet the conditions.

Freight and Package Handling Machinery Bulletin No. 74, free upon request.

Jeffrey Mfg. Co., Columbus, O.

12-31-14

Gages, Differential Recording
Bristol Co., The

Gages, Recording
Bristol Co., The

Garbage Disposal Apparatus
Bartlett & Snow Co., C. O.

Gas Holders
Riter-Conley Mfg. Co.

Gas Plants
Improved Equipment Co.

Gas Producer Plants
Improved Equipment Co.
Otto Gas Engine Works

Generators, Electric
Kerr Turbine Co.

Graders
Austin Mfg. Co.
Western Wheel Scraper Co.

Gravel Washing Plants
Stephens-Adamson Mfg. Co.

Hammers, Steam
Industrial Works
McKiernan-Terry Drill Co.
Union Iron Works

Heaters, Feed Water
Alberger Pump & Condenser Co.
Deane Steam Pump Plant

Hoists
Brown Hoisting Mchry. Co.
Contractors' Plant Mfg. Co.
Dobbie Foundry & Machine Co.
Flory Mfg. Co., S.
Hunt Co., Inc., C. W.
Ingersoll-Rand Co.
Koehring Machine Co.
Lidgerwood Mfg. Co.
Ransome Concrete Machinery Co.
Robins Conveying Belt Co.
Vulcan Iron Works (Wilkes-Barre)

Hoists, Electric
Brown Hoisting Mchry. Co.
Contractors' Plant Mfg. Co.
Dobbie Foundry & Machine Co.
Flory Mfg. Co., S.
Lidgerwood Mfg. Co.
Northern Engr. Works
Whiting Foundry Equipment Co.

Hoisting Drums
Hayward Co., The

Hoops, Wire
American Steel & Wire Co.

Hose, Metallic
Pennsylvania Flexible Metallic Tubing Co.

Hose, Steam
Pennsylvania Flexible Metallic Tubing Co.

Hose, Suction
Edson Mfg. Co.
Pennsylvania Flexible Metallic Tubing Co.

Hydrants
Eddy Valve Co.
McKim Foundry & Machine Co.
Norwood Engr. Co.
Rensselaer Valve Co.
Wood & Co., R. D.

Hydrogen Plants
Improved Equipment Co.

Inks and Adhesives
Higgins & Co., C. M.

Inserts for Concrete
Trussed Concrete Steel Co.

Inspecting Engineers
See Alphabetical Index

Instruments, Drawing
Alteneder & Sons, Theo.
Gurley, W. & L. E.

Instruments, Electrical Measuring
Bristol Co., The

Instruments, Mathematical
Ainsworth & Sons, Wm.

Instruments, Recording
Bristol Co., The

Instruments, Surveying
Ainsworth & Sons, Wm.
Alteneder & Sons, Theo.
Bausch & Lomb Optical Co.
Berger & Sons, C. L.
Buff & Buff Mfg. Co.
Chicago Steel Tape Co.
Gurley, W. & L. E.
Heller & Brightly
Kolesch & Co.
Williams, Brown & Earle

Jacks
McKiernan-Terry Drill Co.

Joints, Flexible Pipe
Coldwell-Wilcox Co.
United States Cast Iron Pipe & Foundry Co.

Kettles, Asphalt and Tar
Union Iron Works

Lamp Posts
Minneapolis Steel & Machinery Co.
Parsons Co., G. W.

Lime Kilns
Improved Equipment Co.

Locomotives, Compressed Air
American Locomotive Co.

Locomotives, Contractors
American Locomotive Co.
Vulcan Iron Works (Wilkes-Barre)

Locomotives, Electric
American Locomotive Co.
Hunt Co., Inc., C. W.
Robins Conveying Belt Co.

Locomotives, Gasoline
American Locomotive Co.

Locomotives, Geared
American Locomotive Co.

Locomotives, Industrial
American Locomotive Co.
Jeffrey Mfg. Co.
Robins Conveying Belt Co.
Vulcan Iron Works (Wilkes-Barre)

Locomotives, Mine
American Locomotive Co.

Locomotives, Passenger and Freight
American Locomotive Co.

Locomotives, Steam
American Locomotive Co.

Machine Guards
Consolidated Expanded Metal Co.'s

Metal Lath
Consolidated Expanded Metal Co.'s

Meters, Boiler Feed Water
Builders Iron Foundry

Meters, Oil and Gas
Bristol Co., The
Builders Iron Foundry
Hersey Mfg. Co.
National Meter Co.
Pittsburgh Meter Co.

Meters, Steam
Builders Iron Foundry

Meters, Water
Bristol Co., The
Builders Iron Foundry
Hersey Mfg. Co.
Hinman Hydraulic Mfg. Co.
National Meter Co.
Pittsburgh Meter Co.
Simplex Valve & Meter Co.
Thomson Meter Co.

Mixers, Asphalt
Foote Concrete Machinery Co.
Smith Co., The T. L.

Mixers (Heated), Asphalt and Concrete
Smith Co., The T. L.

Mixers, Cement
Alexander Iron Works

Mixers, Concrete
Foote Concrete Machinery Co.
Koehring Machine Co.
Municipal Engineering & Contracting Co.
Ransome Concrete Machinery Co.
Smith Co., The T. L.

Mixers, Concrete
Ransome Concrete Machinery Co.

Molds, Pipe and Culvert
Blaw Steel Construction Co.

Nails and Staples
American Steel & Wire Co.

Oxy-Acetylene Apparatus
Oxweld Acetylene Co.

Packing, Metallic
Power Specialty Co.

Paints
Barrett Mfg. Co.
Carbolineum Wood Preserving Co.
Cheesman & Elliot
Hydrex Felt & Engineering Co.
National Lead Co.
Patterson-Sargent Co.
Republic Creosoting Co.
Rinald Bros.

Paints, Graphite
Cheesman & Elliot
National Lead Co.
Patterson-Sargent Co.

Paints, Marine
Cheesman & Elliot
Patterson-Sargent Co.

Paints, Metal Protective
Carbolineum Wood Preserving Co.
Cheesman & Elliot
National Lead Co.
Patterson-Sargent Co.
Republic Creosoting Co.
Rinald Bros.

Paper, Blueprint
Kolesch & Co.
Pease Co., C. F.

Paper, Drawing
Pease Co., C. F.

Paving Blocks, Creosoted Wood
International Creosoting & Construction Works
Republic Creosoting Co.
Wyckoff Pipe & Creosoting Co.

Paving Blocks, Kyanized Wood
Berlin Mills Co.

Paving Joint Fillers
Barrett Mfg. Co.

Piles, Concrete
Raymond Concrete Pile Co.
Simplex Concrete Piling Co.

Pile Drivers
Browning Co., The
Contractors' Plant Mfg. Co.
Industrial Works
McKiernan-Terry Drill Co.
Orton & Steinbrenner Co.
Union Iron Works

Piling, Sheet Steel
Lackawanna Steel Co.

Piling, Wood
Berlin Mills Co.

Pipe Covering
Johns-Manville Co., H.W.
Wyckoff & Son Co., A.

Pipe Fittings
American Pipe & Construction Co.
Builders Iron Foundry
Central Foundry Co., The
Kellogg Co., M. W.
National Tube Co.
United States Cast Iron Pipe & Foundry Co.
Washington Pipe & Foundry Co.

Pipe, Iron
American Cast Iron Pipe Co.
American Pipe & Construction Co.
Central Foundry Co., The
Clow & Sons, Jas. B.
Donaldson Iron Co.
Fox & Co., John
Glamorgan Pipe & Foundry Co.
Lynchburg Foundry Co.
Massillon Iron & Steel Co.
Standard Cast Iron Pipe & Foundry Co.
United States Cast Iron Pipe & Foundry Co.
Warren Foundry & Machine Co.
Wood & Co., R. D.

Pipe Joint Compounds, Pressure
Leadite Co., Inc., The

Pipe, Reinforced Concrete
Lock Joint Pipe Co.

Pipe, Riveted Steel
Des Moines Bridge & Iron Co.
Dover Boiler Works
Gillespie Co., The T. A.
Hinman Hydraulic Mfg. Co.
Kittoe Boiler & Tank Co.
McNeil & Bro., James
Pittsburgh-Des Moines Steel Co.
Riter-Conley Mfg. Co.
Struthers-Wells Co.

Pipe Shoes
Marion Malleable Iron Works

Pipe Specials
Builders Iron Foundry
Kellogg Co., M. W.

Pipe, Steel
National Tube Co.

Pipe, Wood
Michigan Pipe Co.
Pacific Coast Pipe Co.
Pacific Tank & Pipe Co.
Portland Wood Pipe Co.
Redwood Manufacturers Co.
Washington Pipe & Foundry Co.
Wyckoff & Son Co., A.
Wychoff Pipe & Creosoting Co

Plows
McKim Foundry & Machine Co.
Western Wheeled Scraper Co.

Poles, Cross-arms, Etc. (Treated Wood)
Berlin Mills Co.

Poles, Tubular Steel
American Bridge Co.
Franklin Steel Works
National Tube Co.

Powder
Keystone National Powder Co.

Power Transmission Machinery
Bacon, Earle C.
Jeffrey Mfg. Co.
Leffel Co., Jas.
Link-Belt Co.
Morse Chain Co.
Stephens-Adamson Mfg. Co.

Pumps, Air
Cameron Steam Pump Works, A. S.

Pumps, Air Lift
Ingersoll-Rand Co.

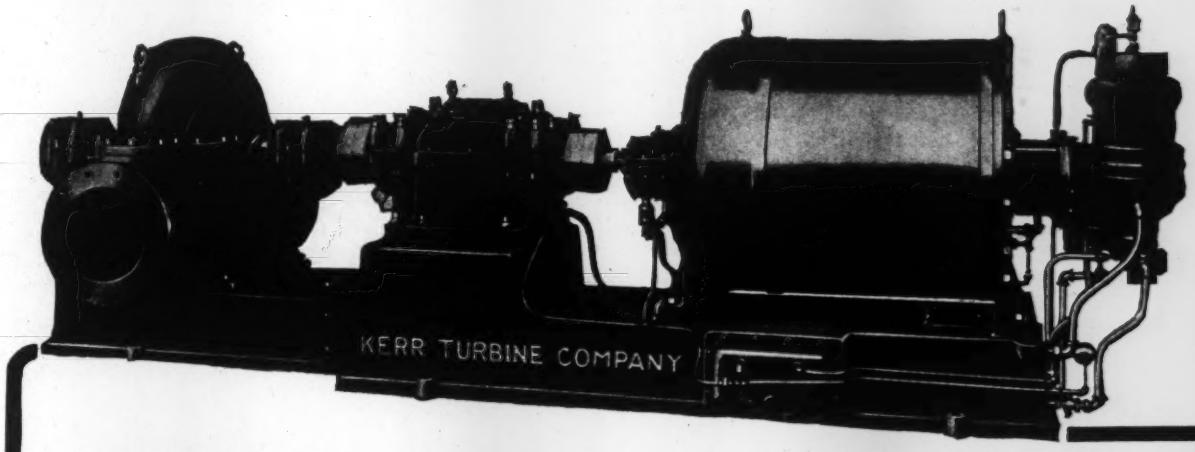
Pumps, Boiler Feed
Blake & Knowles Steam Pump Works
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
Keystone Driller & Pump Co.
McGowan Co., John H.
National Transit Co.

Pumps, Centrifugal
Alberger Pump & Condenser Co.
American Well Works
Cameron Steam Pump Works, A. S.
Darling Pump & Mfg. Co.
Lawrence Machine Co.
Lawrence Pump & Engine Co.
McGowan Co., John H.
Morris Machine Works
Van Wie Pump Co.

Pumps, Contractors
Blake & Knowles Steam Pump Works
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
Edson Mfg. Co.
McGowan Co., John H.
National Transit Co.
Parker, A. A.
Van Wie Pump Co.

Pumps, Deep Well
American Well Works
Blake & Knowles Steam Pump Works
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
Keystone Driller & Pump Co.
National Transit Co.
Van Wie Pump Co.

Pumps, Diaphragm
Boston & Lockport Block Co.
Edson Mfg. Co.
Parker, A. A.



'ECONOMY' Geared Turbines Are Particularly Desirable for Driving Low-Speed Pumps

For instance, in municipal and steel mill pumping service, low steam consumption is essential, and can be obtained only from a turbine equipped with reduction gears. We have in mind a case where 115,000,000 foot-pounds of work per 1000 pounds of dry steam was obtainable from an **'ECONOMY'** Geared Turbine.

Again, we sold an 8,000,000-gal. per day **'ECONOMY'** Geared Pump, guaranteeing a steam consumption of approximately 22 lb. per water horsepower with 27-in. vacuum.

Tell us your conditions and our engineers will show you in figures which is the best type of **'ECONOMY'** Turbine for your work and why. Ask for book, "EN—A System of Steam Turbines."

KERR TURBINE COMPANY

MAIN OFFICE AND WORKS **WELLSVILLE, N. Y.**

New York, Boston, Philadelphia, Baltimore, Charlotte, N. C., Pittsburgh, Cleveland, Cincinnati, Atlanta, Birmingham, Montreal, Toronto, Winnipeg, Indianapolis, Detroit, Chicago, Minneapolis, St. Louis, Kansas City, New Orleans, Houston, Oklahoma City, Denver, Seattle, San Francisco, Oakland, Los Angeles, Sydney, N. S. W., Vancouver, Mexico City, London, Honolulu, Shanghai

ECONOMY

92

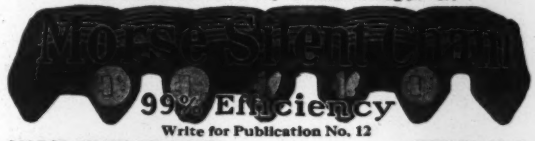
Stephens-Adamson Mfg. Co.
Aurora, Ill.

Designers and Manufacturers of Conveying, Screening and Transmission Machinery.

Refer to last week's issue for regular advertisement.

CONVEYING S-A MFG. CO. ENGINEERS

"The most economical way of transmitting power."



Write for Publication No. 12

MORSE CHAIN COMPANY - - - ITHACA, N. Y

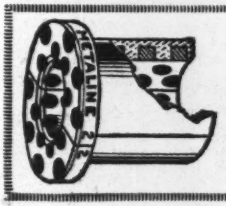
A. S. BERQUIST, BROOKLYN, N.Y., U.S.A. BERQUIST'S SUSPENSION BUNKER. PATENT 30.1909 NO 928.943

The Best Bin for the Least Money

Write me for an estimate.

A. SAM'L BERQUIST

1571 47th Street Brooklyn, N. Y.



METALINE

(Trade Mark Reg.)

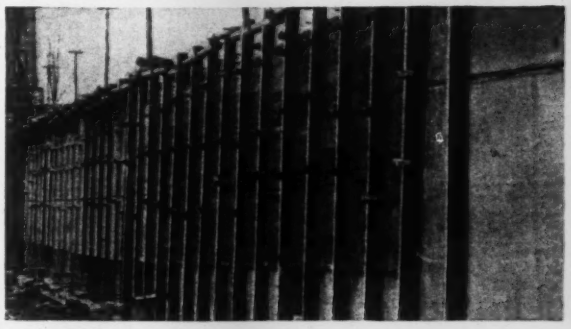
BUSHINGS for LOOSE PULLEYS

and similar places, positively avert the danger of **FIRE** which is always present where oil is used for lubrication.

THE METALINE COMPANY

Sole Manufacturers

6 West Ave. Long Island City, N. Y.



Pressed Steel Concrete Forms are Better

Pressed steel concrete forms are better than wood forms because of at least fourteen good reasons.

HYDRAULIC

Pressed Steel Concrete forms for retaining walls, reservoirs and building foundations can be erected at $\frac{1}{4}$th the cost of erecting wood forms and taken down at $\frac{1}{10}$th the cost and in $\frac{1}{20}$th the time.

Any plate may be removed for inspection without disturbing those around it.

Both sides of plates may be used.

Light, rigid, strong.

Send blueprints for our estimate of your saving on your next concrete job.

HYDRAULIC

The Hydraulic Pressed Steel Co.

Cleveland, Ohio

We will appreciate your addressing your correspondence to us at 3152 E. 61st St.

"Ten acres of pressed steel capacity"

Pumps, Dredging
Ellicott Machine Corp.
Lawrence Machine Co.
Lawrence Pump & Engine Co.
Morris Machine Works
Parker, A. A.
Van Wie Pump Co.

Pumps, Gasoline Portable
Edson Mfg. Co.
Parker, A. A.

Pumps, Mine
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
McGowan Co., John H.
Morris Machine Works
National Transit Co.
Van Wie Pump Co.

Pumps, Oil
Blake & Knowles Steam Pump Works
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
National Transit Co.

Pumps, Power
McGowan Co., John H.
National Transit Co.

Pumps, Tank
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
National Transit Co.

Pumps, Triplex
Deane Steam Pump Plant
McGowan Co., John H.
National Transit Co.

Pumps, Turbine
Alberger Pump & Condenser Co.
American Well Works
Cameron Steam Pump Works, A. S.
Kerr Turbine Co.
Lawrence Machine Co.
Lawrence Pump & Engine Co.
Morris Machine Works

Pumps, Vacuum
Blake & Knowles Steam Pump Works
Cameron Steam Pump Works, A. S.
Deane Steam Pump Plant
McGowan Co., John H.

Purifiers, Feed Water
New York Cont'l Jewell Filtration Co.
Norwood Engr. Co.

Rail Bonds
American Steel & Wire Co.

Rail-joints
Rail Joint Co.

Railways, Industrial
Hunt Co., Inc., C. W.
Jeffrey Mfg. Co.

Rivets
Pennsylvania Steel Co.

Road Oils and Preservatives
Barrett Mfg. Co.
Standard Oil Co. (N. J.)

Road Rollers
Austin Mfg. Co.

Rods, Leveling
Chicago Steel Tape Co.

Rolls, Crushing
Buchanan Co., C. G.

Roofing
Barrett Mfg. Co.
Johns-Manville Co., H.W.

Roofing, Metal
American Sheet & Tin Plate Co., The
Berger Mfg. Co.
Youngstown Iron & Steel Co., The

Rope, Manila
Waterbury Co., The

Rope Transmission
Hunt Co., Inc., C. W.
Waterbury Co., The

Rope, Wire
American Steel & Wire Co.
Waterbury Co., The

Sash, Steel
Trussed Concrete Steel Co.

Scarifiers
Acme Road Mchry. Co.

Schools and Colleges
See Alphabetical Index

Scrapers
Western Wheeled Scraper Co.

Screens, Rotary
Jeffrey Mfg. Co.
Smith Co., The T. L.
Stephens-Adamson Mfg. Co.

Screens, Well
American Well Works

Second-hand Equipment
See Classified List Pages
Astoria Light, Heat & Power Co., The
Gray, Edward
U. S. Equipment Co.
Zelnicker Supply Co., W. A.

Sewage Ejectors
Pacific Flush-Tank Co.

Sheaves
Metaline Co.
Pittsburgh Block & Mfg. Co.

Sheet, Iron and Steel
American Sheet & Tin Plate Co.

Shoes, Wood Pipe
Marion Malleable Iron Works

Shovels
Wyoming Shovel Works, The

Shovels, Steam
Browning Co., The
Marion Steam Shovel Co.
Thew Automatic Shovel Co.

Shutters, Steel and Wood Rolling
Kinnear Mfg. Co.

Sidewalk Forms
Blaw Steel Construction Co.

Skips
Contractors' Plant Mfg. Co.
Insley Mfg. Co.
Ransome Concrete Machinery Co.

Skylights
Kinnear Mfg. Co.

Sluice Gates
Coldwell Wilcox Co.
Hinman Hydraulic Mfg. Co.
Smith Co., S. Morgan

Softeners, Water
American Water Softener Co.
New York Continental Jewell Filtration Co.
Pitttsburgh Filter Mfg. Co.

Spikes
American Steel & Wire Co.

Springs
American Steel & Wire Co.

Stacks
Dover Boiler Works
Kittoe Boiler & Tank Co.
Riter-Conley Mfg. Co.
Wiederholdt Construction Co.

Standpipes
Chicago Bridge & Iron Works
Des Moines Bridge & Iron Co.
Dover Boiler Works
Kittoe Boiler & Tank Co.
Pittsburgh-Des Moines Steel Co.
Schreiber Sons Co., L.
Struthers-Wells Co.
Tippett & Wood
Walsh's Holyoke Steam Boiler Works

Steel Plate Construction
American Bridge Co.
Blaw Steel Construction Co.
Chicago Bridge & Iron Works
Coatesville Boiler Wks.
Des Moines Bridge & Iron Co.
Dover Boiler Works
Franklin Steel Works
Hydraulic Pressed Steel Co.
Kittoe Boiler & Tank Co.
McNeil & Bro., James
Pennsylvania Steel Co.
Pittsburgh-Des Moines Steel Co.
Riter-Conley Mfg. Co.
Struthers Wells Co.
Walsh's Holyoke Steam Boiler Works
Williams Co., G. H.

Steel Posts
American Steel & Wire Co.

Steel, Structural
American Bridge Co.
Belmont Iron Works
Berlin Construction Co.
Blaw Steel Construction Co.
Chicago Bridge & Iron Works
Clinton Bridge Works
Des Moines Bridge & Iron Co.
Eastern Bridge & Structural Co.
Fort Pitt Bridge Works
Franklin Steel Works
Hydraulic Pressed Steel Co.
Kenwood Bridge Co.
Lackawanna Bridge Co.
MacKinnon - Holmes & Co.
McClintic-Marshall Co.
Milwaukee Bridge Co.
Minneapolis Steel & Machinery Co.
Missouri Valley Bridge & Iron Co.
Morava Construction Co.
Mt. Vernon Bridge Co.
Penn Bridge Co.
Phoenix Bridge Co.
Pittsburgh-Des Moines Steel Co.
Riter-Conley Mfg. Co.
Riverside Bridge Co.
Shoemaker & Co., L. F.
Snare & Triest Co.
Strauss Bascule Bridge Co.
Variety Iron & Steel Works
Wisconsin Bridge & Iron Co.
Worden-Allen Co.

Strainers, Well
National Tube Co.

Superheaters, Steam and Air
Power Specialty Co.

Tables and Boards, Drawing
American Drafting Furniture Co.
Economy Drawing Table Co.

Tanks, Concrete
Concrete Steel Co.

Tanks and Towers
American Bridge Co.
American Sheet & Tin Plate Co.
Blaw Steel Construction Co.
Chicago Bridge & Iron Works
Coatesville Boiler Wks.
Des Moines Bridge & Iron Co.
Dover Boiler Works
Kittoe Boiler & Tank Co.
Minneapolis Steel & Machinery Co.
Pacific Tank & Pipe Co.
Pittsburgh-Des Moines Steel Co.
Riter-Conley Mfg. Co.
Struthers-Wells Co.
Tippett & Wood
Walsh's Holyoke Steam Boiler Works

Tanks, Wood
Pacific Coast Pipe Co.
Pacific Tank & Pipe Co.
Redwood Manufacturers Co.

Tapes, Steel and Metallic
Chicago Steel Tape Co.
Lufkin Rule Co.

Telpherage Systems
Brown Hoisting Machinery Co.

Testing Laboratories
See Alphabetical Index

Thermometers, Index and Recording
Bristol Co., The

Ties, Steel
American Bridge Co.

Ties (Treated Wood)
Berlin Mills Co.

Tile, Concrete Building
Trussed Concrete Steel Co.

Timber (Treated)
Berlin Mills Co.

Tin and Terne Plates
American Sheet & Tin Plate Co.

Trailers
Troy Wagon Works Co.

Tramways
American Steel & Wire Co.
Waterbury Co., The

Transmission Towers, Galvanized
American Bridge Co.
Blaw Steel Construction Co.
Riter-Conley Mfg. Co.

Treads, Safety
Concrete Steel Co.

Trenching Machinery
Carson Trench Mach. Co.
Municipal Engineering & Contracting Co.
Parsons Co., G. W.

Tubing, Steel
National Tube Co.

Turbines, Steam
Alberger Pump & Condenser Co.
Kerr Turbine Co.

Turbines, Water
Leffel & Co., Jas.
Smith Co., S. Morgan

Turnbuckles
American Bridge Co.

Turntables
American Bridge Co.
Chicago Bridge & Iron Works
Pennsylvania Steel Co.
Strobel Steel Construction Co.
Whiting Foundry Equipment Co.

Unions
National Tube Co.

Valves, Back Pressure and Atmospheric Relief
McGowan Co., John H.

Valves, Water, Steam, Gas
Coldwell-Wilcox Co.
Darling Pump & Mfg. Co.
Eddy Valve Co.
Hinman Hydraulic Mfg. Co.
Kellogg Co., M. W.
National Tube Co.
Norwood Engrg. Co.
Rensselaer Valve Co.
Smith Co., S. Morgan

Ventilating Apparatus
Sullivan Machinery Co.
Vulcan Iron Works (Wilkes-Barre)

Vulcanized Fibre
Continental Fibre Co.

Wagons, Dump
Austin Mfg. Co.
Troy Wagon Works Co.
Western Wheeled Scraper Co.

Wagons, Reversible
Troy Wagon Works Co.,

Waterproofing
Barrett Mfg. Co.
Carbolineum Wood Preserving Co.
Hydrex Felt & Engineering Co.
Johns-Manville Co., H.W.
Republic Creosoting Co.
Rinald Bros.
Sicilian Asphalt Paving Co.
Trussed Concrete Steel Co.

Welding Apparatus
Oxweld Acetylene Co.

Well Drilling Machines
American Well Works
Keystone Driller & Pump Co.

Well Drilling Supplies
National Tube Co.

Winches
Dobbie Foundry & Machine Co.
Lidgerwood Mfg. Co.

Windows, Steel
Trussed Concrete Steel Co.

Wire Rope Fittings
American Steel & Wire Co.

Wires and Cables
American Steel & Wire Co.

Wood Piling
Republic Creosoting Co.

Wood Preserving
Barber Asphalt Paving Co. (Maurer)
Barrett Mfg. Co.
Carbolineum Wood Preserving Co.
International Creosoting & Construction Co.
Northeastern Co., The
Republic Creosoting Co.

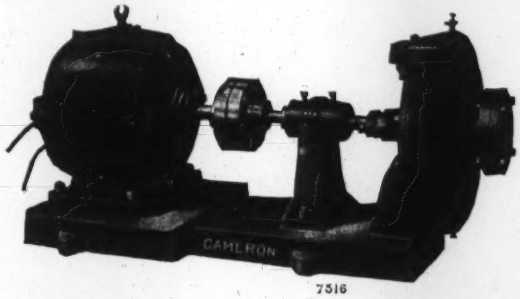
The Slogan of the Cameron—"Character: The Grandest Thing."

Get the Economical Pump—

Cameron Centrifugal

Contractors will find no surer way to secure pumping economy than with "CAMERON" Centrifugals.

These pumps have been designed and built with the special aim to produce a combination of high working value and low operating cost.



7516

Every element in these pumps is given the most careful attention during manufacture. There is no skimping of small details. Every part has strength beyond the utmost load that can fall upon it.

The **Cameron Single Suction Open Impeller** type (illustrated) is especially designed for low head service. It is very simple, strong and rugged all through. It may be driven by electric motor, belt or other motive power.

Standard sizes kept in stock for prompt delivery.

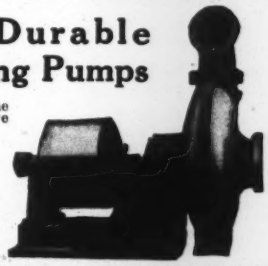
Bulletin No. 152 gives the details. Shall we send it?

A. S. CAMERON STEAM PUMP WORKS

11 Broadway, NEW YORK 12-31 *Offices the World Over*

Efficient and Durable Sand and Dredging Pumps

that give dependable service under the hardest conditions are a distinctive specialty with us.



VAN WIE Latest Improved Dredging Pumps

are built to withstand heavy shocks and will pass solids equal in diameter to that of the discharge pipe without clogging. Casings are split vertically in halves, which construction permits better piston alignment, gives easier access and makes the pump cheaper to repair when only part of the casing is worn. We make Centrifugal Pumps for every purpose. Belted or direct-connected. **Catalog C tells more. Write.**

Van Wie Pump Co., 709-723 W. Fayette St. Syracuse, N.Y.

Successor to Baldwinsville Centrifugal Pump Works

Hubbard & Floyd, New York Representatives, 90 West Street.

Hydraulic Dredges?

We build them. One by us at Panama has pumped coral, sand and rock through 7200 ft. of pipe without relay. Dredges like that mean profit to you. **Write us today for details.**

Ellicott Machine Corporation

Baltimore **Maryland**

Builders of Hydraulic Dredges, Steel Vessels, Lighters and Car Floats

Spare parts always on hand for immediate shipment.

Diving Apparatus

Highest Awards

For every kind of submarine work. Furnishers to U. S. Navy and Army Engineer Corps.

Large stock always on hand.

A. SCHRADER'S SON, INC.

Addr Dept. E, 783-791 Atlantic Ave., Brooklyn, N. Y.

A. J. MORSE, & SON, Inc., 221 High Street, BOSTON, MASS.

Established 1837

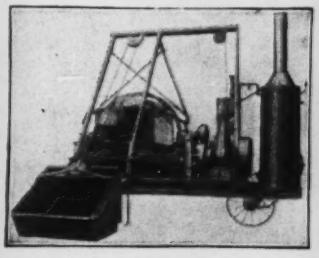
DIVING APPARATUS

LATEST DESIGNS Orders filled day received

U. S. Navy Standard

Special apparatus built to order

AUSTIN Improved Cube Concrete Mixers



Made the World's Best Records on the Panama Canal and Los Angeles Aqueduct. Built in 10 sizes, 2½ to 64 cu. ft. capacity. **Special Machines for Road and Street Paving.**

Send for Catalogue No. 2.

Municipal Engineering & Contracting Co.

Main Office: Railway Exchange, Chicago

New York City, 30 Church St. San Francisco, 473-485 Sixth St.

Agents wanted in open territory

ALPHABETICAL INDEX TO ADVERTISERS

Page

Acme Road Mchry. Co.... 75
Ainsworth & Sons, Wm.... 68
Alberger Pump & Condenser Co.... 18
Alexander Iron Works.... 58
Alpha Portland Cement Co. 6
Alsens American Portland Cement Co.... 59
Alteneder & Sons, Theo.... 67
American Bridge Co.... 62
American Cast Iron Pipe Co.... 21
American Creosote Works. 58
American Drafting Furniture Co.... 67
American Gas Furnace Co. 16
American Locomotive Co.. 73
American Pipe & Construction Co.... 20
American Rolling Mill Co.. 4
American Sheet & Tin Plate Co.... 63
American Steel & Wire Co. 61
American Water Softener Co.... 24
American Well Works, The 3d cover
Astoria Light, Heat & Power Co., The.... 52
Atlas Metal Works.... 4
Atlas Portland Cement Co. 59
Austin Mfg. Co.... 54

Babcock & Wilcox Co.... 16
Bacon, Earl C.... 53
Barber Asphalt Paving Co. The (Maurer).... 58
Bark River Bridge & Culvert Co.... 4
Barrett Mfg. Co., 58, 4th cover
Bartlett & Snow Co., C. O. 18
Bausch & Lomb Optical Co. 68
Belmont Iron Works.... 64
Bergen & Lindeman, Inc... 16
Berger & Sons, C. L.... 68
Berger Mfg. Co.... 65
Berlin Construction Co.... 64
Berlin Mills Co.... 58
Berquist, A. Saml.... 77
Berrian & Douglas..1st cover
Blake & Knowles Steam Pump Works, The.... 14
Blaw Steel Construction Co.... 19, 65
Boston & Lockport Block Co.... 65
Bristol Co., The.... 75
Brown Hoisting Mchry. Co. 55
Browning Co., The.... 54
Buchanan Co., Inc., C. G... 53
Buff & Buff Mfg. Co.... 68
Builders Iron Foundry.... 9

California Corrugated Culvert Co.... 4
Cameron Steam Pump Works, A. S.... 79
Carbolineum Wood Preserving Co.... 58
Carson Trench Mach. Co.. 56
Carter Construction Co.... 65
Central Foundry Co., The.. 21
Cheesman & Elliot.... 66
Chicago Bridge & Iron Wks. 19
Chicago Steel Tape Co.... 67
Classified List.... 50, 51
Clinton Bridge Works.... 63
Clow & Sons, Jas. B.... 21
Coast Culvert & Flume Co. 4
Coatesville Boiler Works.. 18
Coldwell-Wilcox Co.... 24
Concrete Steel Co.... 53
Consolidated Expanded Metal Companies, The... 60
Consulting Engineers, 69, 70, 71
Continental Fibre Co., The. 18
Contractors' Plant Mfg. Co. 56
Corrugated Culvert Co.... 4

Darling Pump & Mfg. Co.. 24
Deane Steam Pump Plant.. 15
Delaware Metal Culvert Co. 4
Des Moines Bridge & Iron Co.... 18
Directory of Consulting Engineers 69, 70, 71
Dixie Culvert & Metal Co. 4
Dobbie Fdry. & Mach. Co.. 54
Donaldson Iron Co.... 21
Dover Boiler Works.... 19

Page

Eastern Bridge & Structural Co.... 64
Economy Drawing Table Co.... 67
Eddy Valve Co.... 24
Edson Mfg. Co.... 14
Ellicott Machine Corp.... 79

Flory Mfg. Co., S.... 54
Foote Concrete Machinery Co.... 60
For Sale Ads.... 50, 51
Fort Pitt Bridge Works... 64
Fox & Co., John.... 20
Franklin Steel Works.... 63
French & Co., Samuel H... 59

Gillespie Co., The T. A.... 19
Glamorgan Pipe & Foundry Co.... 21
Gray, Edward.... 52
Gurley, W. & L. E.... 68

Hardesty Mfg. Co., R.... 4
Hartranft Cement Co., Wm. G.... 59
Hayward Co., The.... 57
Heine Chimney Co.... 16
Heinicke, Inc., H. R.... 16
Heller & Brightly.... 68
Hersey Mfg. Co.... 25
Higgins & Co., Chas. M.... 66
Hinman Hydraulic Mfg. Co., The.... 25
Hunt Co., Inc., The C. W.. 75
Hydraulic Pressed Steel Co. 77
Hydrex Felt & Engineering Co., The.... 66

Illinois Corrugated Metal Co.... 4
Improved Equipment Co... 18
Independence Culvert Co.. 4
Industrial Works.... 55
Ingersoll-Rand Co.... 26
Insley Mfg. Co.... 60
Inspecting Engineers.... 71
International Creosoting & Construction Co.... 58
Iowa Pure Iron Culvert Co. 4
Ironton Portland Cement Co., The.... 59

Jeffrey Mfg. Co.... 75
Johns-Manville Co., H. W.. 17

Kellogg Co., M. W.... 16
Kentucky Culvert Co.... 4
Kenwood Bridge Co.... 64
Kerr Turbine Co.... 77
Keystone Driller & Pump Co.... 15
Keystone National Powder Co.... 24
Kinnear Mfg. Co., The.... 65
Kittoe Boiler & Tank Co... 19
Koehring Machine Co.... 12
Kolesch & Co.... 68

Lackawanna Bridge Co.... 65
Lackawanna Steel Co., 2d cover
Laclede Steel Co.... 65
Lawrence Cement Co.... 58
Lawrence Machine Co.... 15
Lawrence Pump & Engine Co., The.... 14
Leadite Co., Inc., The.... 21
Lee-Arnett Co.... 4
Leffel & Co., James.... 14
Lehigh Portland Cement Co.... 59
Lidgerwood Mfg. Co.... 54
Link-Belt Co.... 55
Lock Joint Pipe Co.... 20
Lone Star Culvert Co.... 4
Lufkin Rule Co., The.... 66
Lyle Corrugated Culvert Co.... 4
Lynchburg Foundry Co.... 21

MacKinnon-Holmes & Co.. 64
Main Belting Co.... 17
Marion Malleable Iron Wks. 22
Marion Steam Shovel Co., The.... 53

Page

Massillon Iron & Steel Co.. 21
Maurer & Son, Henry.... 66
McClintic-Marshall Co.... 62
McConway & Torley Co.... 52
McGowan Co., John H.... 14
McGraw-Hill Book Co., Inc. 27
McKiernan-Terry Drill Co. 26
McKim Foundry & Machine Co.... 20
McNeil & Bro., James.... 18
Metaline Co., The.... 77
Michigan Bridge & Pipe Co.... 4
Michigan Pipe Co., The.... 24
Milwaukee Bridge Co.... 65
Minneapolis Steel & Machinery Co.... 65
Missouri Valley Bridge & Iron Co.... 65
Montana Culvert Co.... 4
Morava Construction Co... 64
Morris Machine Works.... 7
Morse Chain Co.... 77
Morse & Son, Inc., A. J... 79
Mount Vernon Bridge Co.. 64
Municipal Engineering & Contracting Co.... 79

National Lead Co.... 66
National Meter Co.... 25
National Transit Co.... 14
National Tube Co.... 20
Nazareth Cement Co.... 58
Nebraska Culvert & Mfg. Co.... 4
Nevada Metal Mfg. Co.... 4
New England Metal Culvert Co.... 4
N. Y. Continental Jewell Filtration Co.... 20
Norfolk Creosoting Co.... 58
North East Metal Culvert Co.... 4
Northeastern Co., The.... 58
Northern Engr. Works.... 73
North Western Expanded Metal Co.... 60
Northwestern Sheet & Iron Works.... 4
Norwalk Iron Works Co... 26
Norwood Engineering Co.. 20

Ohio Corrugated Culvert Co.... 4
Ohio Locomotive Crane Co. 54
O'Neall Co., W. Q.... 4
Orton & Steinbrenner Co... 55
Otto Gas Engine Works... 17
Owen Bucket Co.... 57
Oxweld Acetylene Co.... 64

Pacific Coast Pipe Co.... 23
Pacific Flush Tank Co.... 18
Pacific Tank & Pipe Co... 23
Parker, A. A.... 14
Parsons Co., The G. W.... 56
Patterson-Sargent Co.... 66
Pease Co., The C. F.... 67
Penn Bridge Co.... 65
Pennsylvania Flexible Metallic Tubing Co.... 15
Pennsylvania Metal Culvert Co.... 4
Pennsylvania Steel Co., The 62
Phoenix Bridge Co., The.. 62
Pittsburgh Block & Mfg. Co.... 65
Pittsburgh-Des Moines Steel Co.... 18
Pittsburgh Filter Mfg. Co.. 24
Pittsburgh Meter Co.... 25
Portland Wood Pipe Co... 24
Positions Open & Wanted, 49, 50
Power Specialty Co.... 18
Proposals.... 47, 48, 49

Rail Joint Co., The.... 73
Ramapo Iron Works.... 73
Ransome Concrete Machinery Co.... 13
Raymond Concrete Pile Co. 3
Redwood Manufacturers Co. 22
Rensselaer Valve Co.... 24
Republic Creosoting Co.... 58
Rinald Bros.... 66
Riter-Conley Mfg. Co.... 64
Riverside Bridge Co.... 65
Road Supply & Metal Co... 4
Robins Conveying Belt Co. 75

Page

Schools & Colleges.... 72
Schrader's Sons, Inc., A... 79
Schreiber & Sons Co., The L. 64
Second-Hand Material... 50, 51
Sessions Foundry Co., The. 20
Shoemaker & Co., Lewis F. 62
Sicilian Asphalt Paving Co., The.... 53
Simplex Concrete Piling Co. 64
Simplex Valve & Meter Co. 25
Sioux Falls Metal Culvert Co.... 4
Smidth & Co., F. L.... 63
Smith Co., S. Morgan.... 14
Smith Co., The T. L.... 10, 11
Smooth-On Mfg. Co., The.. 61
Snare & Triest Co.... 52
Snead Architectural Iron Works.... 63
Snow Steam Pump Plant.. 17
Spencer, J. N.... 4
Spokane Culvert & Tank Co.... 4
Standard Cast Iron Pipe & Foundry Co.... 21
Standard Oil Co.... 53
Stephens-Adamson Mfg. Co. 77
Strauss Bascule Bridge Co. 65
Strobel Steel Construction Co.... 65
Struthers-Wells Co.... 19
Sullivan Machinery Co.... 26

Tennessee Metal Culvert Co.... 4
Terry & Tench Co., Inc., The 54
Testing Engineers.... 71
Thew Automatic Shovel Co. 56
Thomson Meter Co.... 25
Tippett & Wood.... 18
Troy Wagon Works Co.... 8
Trussed Concrete Steel Co., 5, 61

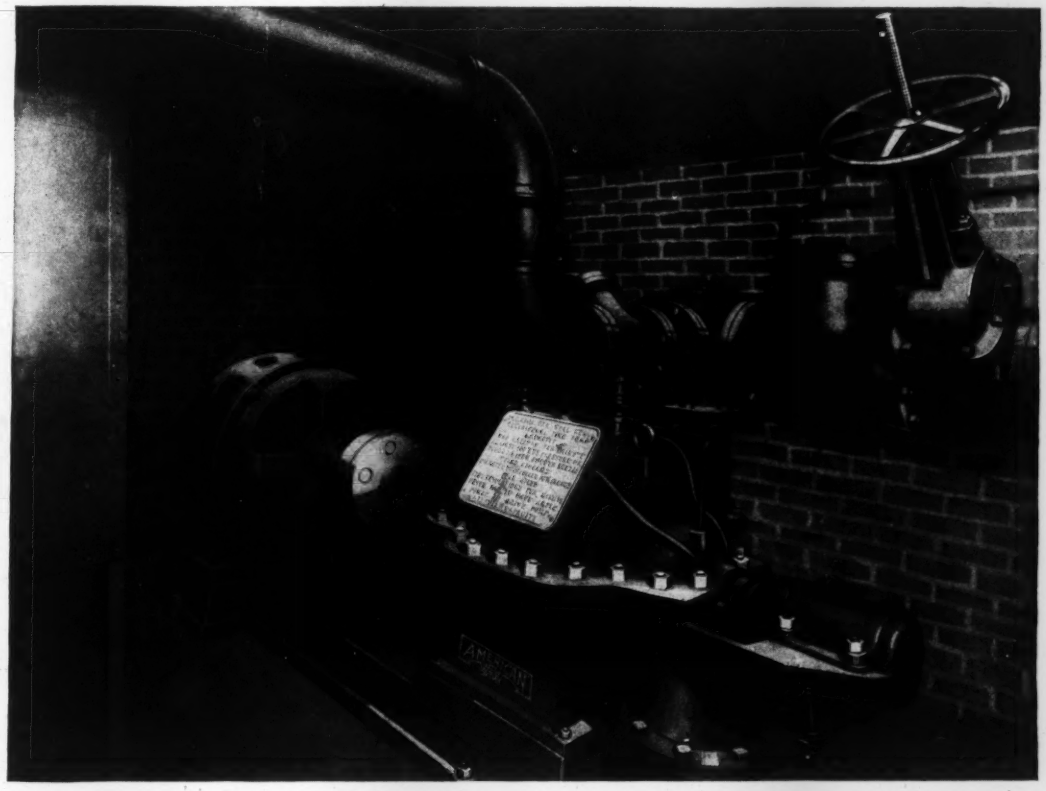
Union Iron Works.... 56
U. S. Cast Iron Pipe & Foundry Co.... 21
U. S. Equipment Co.... 52
Universal Drafting Machine Co.... 67
Utah Culvert Co.... 4

Van Wie Pump Co.... 79
Variety Iron & Steel Works Co.... 63
Virginia Metal Culvert Co.. 4
Vulcan Iron Wks. (Wilkes-Barre).... 73

Wallace Supply Co.... 63
Walsh's Holyoke Steam Boiler Works.... 18
Want & For Sale Ads.. 49, 50
Warren Foundry & Machine Co.... 21
Washington Pipe & Foundry Co.... 22
Waterbury Co., The.... 24
Weber Chimney Co., The.. 16
Western Metal Mfg. Co.... 4
Western Wheeled Scraper Co.... 52
Westinghouse Air Brake Co.... 26
Whiting Foundry Equipment Co.... 55
Wiederholdt Construction Co.... 16
Wiley & Sons, Inc., John... 28
Williams, Brown & Earle. 68
Williams Co., The G. H... 57
Wisconsin Bridge & Iron Co.... 63
Wood Co., R. D.... 14
Worden-Allen Co.... 65
Wyckoff & Son Co., A.... 24
Wyckoff Pipe & Creosoting Co.... 58
Wyoming Shovel Wks.... 26

Youngstown Iron & Steel Co., The.... 64

Zelnicker Supply Co.... 52



The Overloading Features of "American" Underwriters' Pumps

The important features of an underwriters' pump are efficiency, reliability and the ability to meet varying pumping conditions without injury to pump or motor.

The accompanying view shows an installation of an "American" Underwriters' pump in the basement of the building of the Phoenix-Hermetic Company, Chicago, Ill.

Pump is an "American" Type K, two-stage, horizontal split casing centrifugal, direct-connected by flexible shaft coupling to a 75-horse power, 3-phase, 60-cycle, 220-volt, 1750 R.P.M., slip ring, motor and has a capacity of 750 gallons per minute when pumping against 100 lbs. pressure.

When this pump was tested by the underwriters for overload characteristic the overload from hose rupture was less than 4 per cent.

American fire pumps not only meet all underwriters' specifications, but must meet our manufacturing standard which is far more rigid than the requirements of any insurance organization.

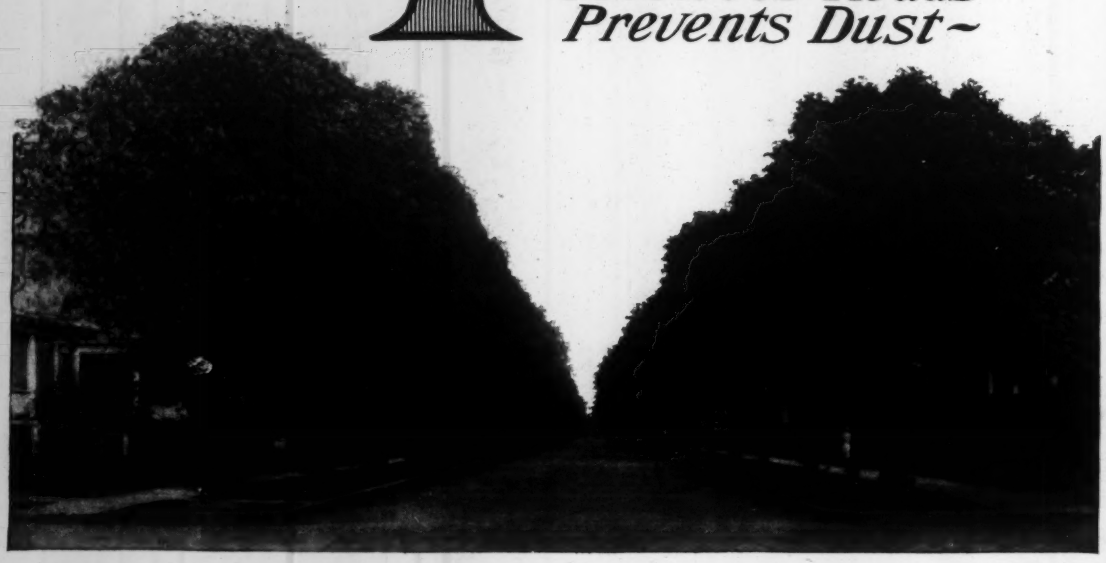
Catalog 132 describes about 50 styles of American Centrifugals. Write for it.

The American Well Works

General Office and Works: Aurora, Ill.
Chicago Office: First Nat'l Bank Bldg.

Tarvia

Preserves Roads Prevents Dust~



Lakewood Avenue, looking north from Berwyn Avenue, Chicago. Treated with "Tarvia B."

How to make old macadam roads last—

IN a macadam roadway already in use, the interstices are so tightly packed that any surface binder to be of value must be a liquid of such a nature as to percolate far enough into the road to bond the surface. For such work we recommend our "Tarvia B," which can be applied, without heating, from barrels, from a sprinkling-cart, or from the modern types of spraying-machines.

The road must be clean, as loose dust will tend to prevent the entrance of Tarvia. The Tarvia will penetrate into the road and harden so that it will not track off under either foot or vehicle traffic. The odor during application is not unpleasant and disappears entirely within a day or two. The resulting surface is smooth, firm, waterproof and clean.

Treatment with "Tarvia B," if begun in time, will keep an old macadam road in good condition long after it otherwise would be unfit for traffic.

The cost of the "Tarvia B" treatment is offset by savings in maintenance cost and renewals, and the road is always far superior to untreated macadam.

Construction and resurfacing work are done with "Tarvia A" and "Tarvia X."

Our road engineers are prepared to advise you on any road problems.

Booklet about the treatment on request.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati
Pittsburgh Detroit Birmingham Kansas City Minneapolis Salt Lake City Seattle
THE PATERSON MFG. CO., Limited: Montreal Toronto Winnipeg Vancouver
St. John, N. B. Halifax, N. S. Sydney, N. S.

TRADE B MARK

$$\int_a^{a+h} \sqrt{xy}\, b\, dy = b\,\frac{\sqrt{x}\,y^{\frac{3}{2}}}{\frac{3}{2}}\Big]_a^{a+h} = \frac{2}{3}\,b\left[(a+h)^{\frac{3}{2}} - a^{\frac{3}{2}}\right]$$